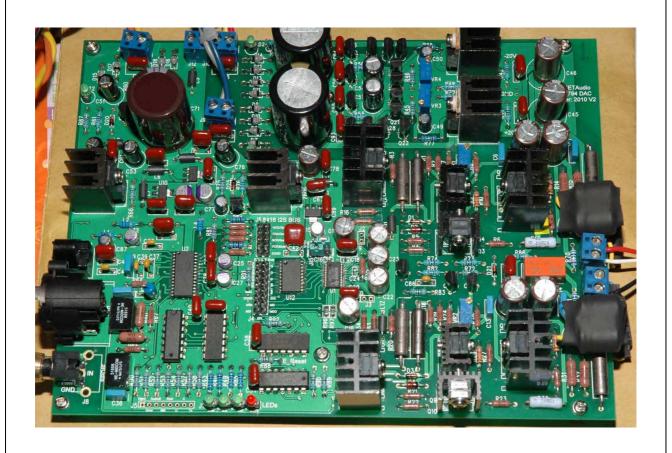
## 'PCM1794A Single End DAC'

&

### 'PCM1794A Full Balance DAC

# High Fidelity 24 bit\*192kS/s Digital to Analogue Converter

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## **Manual**

#### A. Introduction:

These DACs are designed for the serious audiophile. They utilize the best DAC chip - PCM1794A that is capable of producing a super dynamic range of 127dB in stereo mode and 132dB in mono mode!

The I/V and analogy sections are custom designed and use 100% discrete components. The I/V converter is a "Current Steering" topology and the analogy section is a pure 'Class A' non negative feedback driver and output buffer stages. With this combination, the sound will be musical, dynamic, accurate and real.

In Single End version, the DAC uses one circuit board with one PCM1794A DAC chip working in Stereo Mode. In Full Balance version, the DAC uses two circuit boards (one Master and the second Slave) and two PCM1794A DAC chips, each configured in mono mode (namely Mono L and Mono R) to deliver super dynamic range of 132dB.

Users can start with Single End version to see if the performance is up to the expectation of Hi-Fidelity. To protect your investment, a very clear and simple upgrade path is built into the design. Users of the Single End version can easily upgrade to the True Full Balance version anytime by adding a second slave DAC board! The sonic improvement of the Full Balance version brings new meaning to the word 'High-Fidelity'!

These 'serious audiophile' DACs are peppered with high quality audiophile grade components that are selected because of their complementary sonic signatures after many exhaustive hours of listening tests. Audio transistors, Paper-In-Oil capacitors, Silmic II capacitors and Dale resistors are widely used in the DACs.

However, the most important feature is that these DACs sounds musical, dynamic, open and warm with an unparalleled resolving power. These are truly remarkable DACs capable of holding themselves against any branded DAC costing many times more!

#### **B. Specifications:**

- 1. DAC chip: Texas Instruments PCM1794A 24bit/192k best in class DAC
- 2. Digital Receiver: Crystal CS8416 24bit/192k digital receiver
- 3. I/V and Analogy Filter: Discrete transistor I/V (current steering) operating in pure Class A mode with NO global feedback for the best sonic performance
- 4. Digital Input: SPDIF, AES, Toslink and I2S Bus (RCA, XLR female, Optical and 8x2-pin header)
- 5. Bit/Sampling Frequency: Up to 24bit/192k
- 6. Analogy Output: Stereo Channels (Single End) @ 1.5Vrms (expandable to Full Balance output by using two boards @ 3Vrms)
- 7. Output Impedance: 150 ohm Single End mode; 300 ohm Full Balance mode

8. Auto muting for noiseless operation when no audio/digital signal is detected or when a digital error occurs (e.g. AC-3 signal) or when powering up or down

- 9. Power supply: AC 17~18V x 2, 0.5A and AC 8~9V x 1, 0.5A; total consumption 7W/board
- 10. Display LEDs: PLL Lock, 48k, 96k and Mute (for CS8416 input only)
- 11. Distortion: Typically at or less than 0.02% 1kHz at FS, 20kBW Single Ended @ 1.5Vrms. At full bandwidth typically no more than 0.04%.
- 12. Board: 6 x 8 inches double sided 1.6mm gold plated FR4; 6 x M3 supporting holes; max height part 35mm.

#### **C. Circuit Description:**

#### 1. Digital Receiver:

The Crystal Digital Receiver Chip CS8416 is operated in hardware mode set by R81 thus providing a maximum of 4 digital inputs. In this board, only 3 of the 4 inputs are used (RXP1 to 3) for SPDIF (RCA), AES (XLR female) and Toslink (Optical). The forth RXP0 input is not used.

The output of CS8416 is preset to the I2S format and the external I2S input signal from J4 8x2-pin header (pin 1 to pin 8). The 74VHC244 is used to select the I2S signal either directly from the CS8416 or externally via J4. The selection of the input by pins 9-10 of J4 is as below:

| ISELO (J4<br>pin 9) | ISEL1 (J4 pin<br>10) | Description                               |
|---------------------|----------------------|---|
| 0 (GND)             | 0 (GND)              | I2S via J4 (External I2S signal selected) |
| 0 (GND)             | 1 (+3v3)             | SPDIF RCA selected (default)              |
| 1 (+3v3)            | 0 (GND)              | AES XLR selected                          |
| 1 (+3v3)            | 1 (+3v3)             | Toslink Optical selected                  |

Note that if there is no signal on pin 9 and 10 of J4, the default input is set to RCA – SPDIF input by onboard resistors.

#### Full Balance Output (Two Boards Required):

In addition to the output signal from J4, there is another custom designed pin header J6 (5 x 2 pin). J6 is the I2S bus output for the CS8416 that will drive a second slave board via the second board's J4 connection. When the master board is set to "Mono L" mode and the slave board is set to "Mono R" mode by onboard jumpers J15 and J16, the result will be a true Full Balance DAC using two boards. To achieve the lowest possible jitter performance, the I2S connector cable should be as short as possible or not longer than 25cm.

#### **D. PCM1794A DAC**

The input data format for the PCM1794A is set to the I2S format via R96 and R97 to ground. J15 and J16 is the logic selector for Mono via pin 1 and CHSL via pin 2 of PCM1794A respectively. Pin selections for stereo and mono modes are:

| Mono (J15)        | CHSL (J16)        | PCM1794A output Mode |
|-------------------|-------------------|----------------------|
| 0 (short pin 2-3) | 0 (short pin 2-3) | Stereo               |
| 1 (short pin 1-2) | 0 (short pin 2-3) | Mono L channel       |
| 1 (short pin 1-2) | 1 (short pin 1-2) | Mono R channel       |

Thus when two boards are used with one set to Mono L and the other to Mono R, we have a true full balance output version of DAC. The connection of the J6 & J4 of the two boards will be as below (assuming Board 1 is the digital source master and board 2 is slave board):

| Board 1 J6 pin | Board 1 J6 pin  | Board 2 J4 pin | Board 2 J4 pin |
|----------------|-----------------|----------------|----------------|
| 1 WCK          | 2 DGND          | 1 WCK          | 2 DGND         |
| 3 SDA          | 4 DGND          | 3 SDA          | 4 DGND         |
| 5 BCK          | 6 DGND          | 5 BCK          | 6 DGND         |
| 7 SCK          | 8 8416 Mute Out | 7 SCK          | 8 MUTE In      |
| 9 DGND         | 10 DGND         | 9 ISELO        | 10 ISEL1       |

Then pins 9 & 10 of J4 on Board 2 will be forced to Ground to select the external I2S input. A 5x2 pin header to 8x2 pin header cable should be used to connect the boards together in this full balance mode operation.

#### E. I/V Section

The I/V converter uses the "current steering" method and two common base transistors as the current pass through device. The input common base transistors Q1 and Q2 are biased at about 10mA by a current source from another two transistors Q3 and Q4 from the positive supply. Since the PCM1794A output (sink) about 6.2mA to ground (or the negative supply), this current will superimpose with the bias current. Therefore, when no signal is detected, the input transistor bias will be at about 16.2mA. Since the PCM1794A swing current is 7.8mA peak-to-peak, the minimum and maximum current at Q1 and Q2 will be 12.3mA and 20.1mA respectively. Thus a medium powered transistor with a heat sink is selected to handle this current and voltage ratings.

The input signal current of 7.8mA p-p will then pass through R1 and R2 (I/V resistors), which convert the current into voltage. The signal voltage at Full Scale across R1 and R2 is about 2.6Vrms. C1 and C2 are the I/V capacitors that will create a single pole low pass filter roll off at frequency about 50kHz.

Diode (D1) should be a low forward voltage Schottky diode to prevent the PCM1794A's current output pins from being driven to negative voltages (below ground). If this happens, it will increase harmonic distortions tremendously at peak levels.

Q5, Q6, Q7 and Q8 form a pure "Class A" driver and output buffer stage. As Q7 and Q8 are biased to between 20mA to 22mA, a heat sink is required. Q5 and Q6 are biased at about 2mA.

Please note that the transistors are thermally coupled in pairs to reduce thermal drift. If the transistors are matched from same batch (date code), the output DC offset can be kept to a minimum.

VR1 adjusts the output DC offset, which should be adjusted to as close to 0Vdc as possible (at point A). R15 and C3 will remove unwanted high frequency noise further. C81 and C82 will block any potentially damaging DC voltage from flowing into the first stage of the preamplifier. Bi-Polar and/or film capacitors are recommended at C83 & C84. Besides BP capacitor, other capacitors including Paper-In-Oil (PIO) and Polypropylene can be used too. The hole-sizes of C83 & C84 are enlarged for easy connection of bigger external capacitors.

The output decoupling capacitors C81 and C82 may be removed and shorted with a wire for sonic comparison. In this way, the DAC is Output Capacitor Less (OCL) mode.

\*\*\* NOTE: TRY OCL MODE AT YOUR OWN RISK AS ANY DC DRIFT OR SURGE MAY DAMAGE THE PRE-AMP, POWER AMP AND EVEN SPEAKERS DESPITE THE OUTPUT PROTECTION / MUTING CIRCUITARY. \*\*\*

#### F. Power Supply and Regulators

There is nothing unique about the power supply design except that the PCB layout is designed with particular focus on a proper "star" ground return path. Chokes and beads are used to reduce cross-noise interference. Normal speed regulators are selected for their musical sound and audio grade capacitors are selected for best overall sonic signature.

#### 1. Digital Section:

A separate 9Vac supply is used for all the digital sections of the CS8416, logic circuits and the PCM1794A. There are two 5V LM7805 type regulators and three 3.3V sub-level regulators in this section. For best noise and sonic performance, one 5V and one 3.3V regulator are dedicated for the PCM1794A DAC.

#### 2. I/V Section:

The transistor I/V section is powered by  $18V \times 2$  AC sources that are then filtered and regulated by a super low noise and low drop out regulator to +/-20Vdc. VR3 and VR4 adjust their output voltages.

#### 3. Importance of Layout & Grounding:

With so many regulators working simultaneously in the digital, DAC and I/V sections, the board layout and grounding path designs are critical in achieving a low ground noise floor. Various grounding techniques are employed here resulting is a very low ground noise floor of below –135dbV (SE mode), which is confirmed by the FFT measurements taken. In fact, the noise floor is lower than what the equipment can measure!

#### 4. Distortion:

There are basically 4 harmonics distortions in the FFT chart that are mainly due to the non-linearity of the transistor I/V converter. With the clean noise floor and minimum harmonic

spikes, the background of the sound will be very quiet and smooth! This is the main reason why this DAC pleases the ears more easily than normal op-amp base DAC even where the distortion levels are 10 or 100 times less.

A low noise transformer is also required for such low noise floor and low hum level results. Thus a R-core transformer or low noise type transformer is highly recommended.

#### **G.** Component choices

- 1. Digital Receiver: The DIR9001 was evaluated during the initial hardwire version. However, after many hours of listening tests comparing it to the CS8416, it was decided not to use the DIR9001. Our listening tests concluded that the CS8416's sonic performance was superior to that of the DIR9001 in this platform.
- 2. PCM1794A: This is currently the best DAC chip available on earth with a 127db dynamic range for stereo mode and 132 db for mono mode. Many other DAC chips are 24/192k (some claim they are even 32 bits) capable but their dynamic ranges are usually no better than 120db.
- 3. I/V transistors: The high-speed medium power driver stage transistors (2SC3421Y & 2SA1358Y) by Toshiba are used. Their high Ft will prevent any signal roll-off at high audio frequencies. Their high current rating can easily cope with the demanding current output of the PCM1794A. Their bigger size also helps dissipate the power/heat generated in pure Class A operation.
- 4. Capacitors: Power supply filtering capacitors for both the I/V stage and PCM1794A are Elna Silmic II audio grade for best sonic performance. I/V LPF filtering is Russian PIO K40Y-9 or equivalent for best dynamics, transparency and smoothness in sound. The output decoupling capacitor should be good bi-polar capacitors (Elna RBD, Panasonic SU, Nichicon Muse ES or Black Gate N depending on sonic preference) or Russian PIO MBGO, KGB or better. In the digital section, Sanyo OS-Con is used due to their low ESR and high reliability. With these capacitors, the DAC will be transformed from good to excellent! See the Bill of Materials for capacitor selection.
- 5. Resistors: Although the impact on the performance of the DAC may not be as significant as with changes in capacitors, Dale resistors are widely used throughout the signal path circuit from digital input to analogy output for its low noise and low temperature drift properties. See the Bill of Materials for various selection of resistor.
- 6. Rectifiers: High-speed fast recovery Philips/Vishay BYV27 series is selected for their outstanding sonic performance and accuracy.

#### H. Sonic Performance & D1V33 comparison

Many DIYers have listened to the D1V3 or D1V33 DAC using the PCM63 DAC chip. So how does the new PCM1794A DAC compare in listening tests?

In my opinion, I still believe the PCM63 is the best 20-bit R2R DAC ever made. It has a very good output current driver stage, which is necessary for achieving hi fidelity, especially in a well-designed DAC, like the D1. The PCM63 has a very open, smooth and involving sound.

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The bass, which is deep and extended, is its strength. This helps create depth and thickness (harmonics) in the music.

With the PCM1794A, its 'killer' feature is its resolving power. The PCM1794A trumps the PCM63 as it is capable of 24bit/192k format playback, which the PCM63 cannot. Therefore, if listeners want to enjoy the world of 24bit/192k hi resolution playback, the PCM63 is not an option.

In my opinion, the sonic signature of this PCM1794A DAC in single ended mode is better than that of the PCM63; smooth, open and musical but with the added advantage of a much higher dynamic range, resolving power and accuracy. This adds to the dynamism of the music. The soundstage is transparent, open and deep.

With the addition of a second slave board, the DAC is transformed into a true Full Balance mode operation. In this configuration, it will easily outperform the D1 in every aspect. The music is more open, smooth and involving. If the D1 is sweet, then in balanced-mode, the PCM1794A can be characterize as 'natural honey sweet'; its music is very life-like, detailed, accurate, dynamic and musical. At the same time, the resolving power and dynamic range performance of the PCM1794A is maximized. In mono-mode, the dynamic range increases to 132 dB! This improves and extends the soundstage beyond the physical boundaries of the speakers whilst at the same time, increasing the tonal 'accuracy' and 3D placements of the music. It gives the feeling of 'just like being there'.

It is our belief that for the PCM1794A Single End mode and Full Balance mode to excel, they need to be partnered with equally competent transports and other components down the chain.

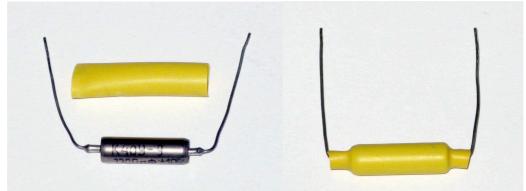
Overall the PCM1794A SE and FB DACs are very well balanced DACs. Furthermore, as it is capable of playing the new 24bit/192k high-resolution format music files, it is a sure winner!

In simple terms, this PCM1794A DAC delivers the same or superior high audiophile performance of the PCM63 but with an even higher resolution plus support for today's high bit and high sample rate recording music sources.

#### **I. Assembly & Adjustment Instruction**

8.

- 1. Please take necessary ESD precautions, as all the parts are ESD sensitive!
- 2. Solder all SMD IC: PCM1794A, 74VHC244 and CS8416CSZ. Align the markings of the IC with the text on the PCB screen-printing.
- 3. Solder all SMD resistors and chip capacitors R96/97, C16, C18, C20, C24.
- 4. Wash the flux of all SMD parts by using flux-cleaning agent.
- 5. Solder all 3 SMD regulator U8 ~ U10 and Logic IC 74HC00/02. Align the markings of the IC with the text on the PCB screen-printing.
- 6. Solder the rest of the parts starting from the smallest parts first, preferably also by component type. For example, resistors, chokes, beads, diodes, PIO & film caps etc... For SANYO OS-CON SMD capacitors, pull the leads straight and insert into the PCB holes before soldering.
  - \*\*\*<u>Note:</u> Do not solder all the active parts with heat sinks U7, U11, U17, U18, Q1/2, Q3/4, Q5/6, Q7/8, Q9/10, Q11/12, Q13/14, Q15/16 and Q17/Q18. \*\*\*
- 7. When soldering C1, C2, C3, C8, C9 & C10 (Russian PIO) capacitors, precaution has to be taken to prevent its body from shorting to the pad below. Two methods are suggested here: 1) use shrink wrap to insulate the body of all PIO capacitors or 2) use insulation tape to cover the pads of C57, C58, C59, C60, C66 & C86.





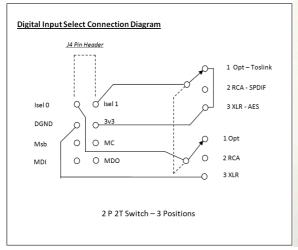
- 9. There is no need to solder J2, J3 and J5.
- 10. For J15 and J16, short pins 2 and 3 (square pad is pin 1) by jumpers provided for singleend stereo operation. Please refer to Section D on page 3 for mono settings for full balance mode operation.
- 11. For DC measurement, the reference point should be J12 Chassis ground.
- 12. Prepare the parts with heat sink as shown in diagram with markings facing up. Note that two transistors of same type are mounted onto one heat sink. All transistors should be properly aligned one on top of the other with markings facing upwards. H7 and H11 is a taller heat sink of 30mm height for 2SA1358. \*\*\*Please do not over tighten the retaining screws as it may cause the transistors to fail or break!\*\*\*
- 13. The two grey insulating pads together with the white holding washers should be used when mounting the IRF610 and IRF9610 to isolate its heat sink from ground. Failure to do so will short the regulators and possibly damage it and/or the board. For the transistor and regulator TA7805, this isolation is not necessary.



- 15. Solder one TA7805 regulator at U7 and then connect a 9Vac to J11. Immediately measure the DC voltages at the heat-sink of U8 and U10. They should be at 3.3V +/-0.1V. Check the voltage at L7. It should be at 5V+/-0.1V. Then check the voltage at L9. It should be at about 12.5Vdc. Disconnect the supply at J11.
- 16. Solder the second TA7805 regulator IC at U11 and then connect a 9Vac to J11 again. Immediately measure DC voltages at L8. It should be 5V+/-0.1V. Then measure the voltage at the heat sink of U8. It should be 3.3V +/-0.1V dc. Once completed, disconnect the 9Vac supply at J11 again.
- 17. If the measurements at the regulators are not correct, cut the power immediately and check for soldering problems! Caution!! If voltages are too high, it may damage the expensive CS8416 and PCM1794A ICs!
- 18. Solder Q17 IRF610 and connect an 18Vac to J10. Measure the voltage at the Q17 heat sink and adjust VR4 until the voltage is at –20V+/-0.05V dc. Disconnect power at I10
- 19. Solder Q18 IRF9610 and connect an 18Vac to J9. Measure the voltage at the Q18 heat sink and adjust VR3 until the voltage is at 20V+/-0.5V dc. Disconnect power at J9.

20. Solder Q1 to Q8 on the PCB together with all their heat sinks. Connect all three power supplies; 9Vac to J9 and 18Vac to J10 and J11. Check that the regulated voltages at Q17 and Q18 are still at –20V and +20Vdc respectively. Then measure the DC voltage at point A (C83) and adjust VR1 until the voltage is below +/-1mVdc. If near OVdc is not possible at Point A, then something is wrong with the board. Disconnect all power immediately and see if any parts are shorted or if there is an open solder.

- 21. Now solder Q9 to Q16 on the PCB and repeat the previous step but with adjustment at VR2 and measurement at point B (C84).
- 22. Note that these DC voltages at point A and B will need to be adjusted again after about 30 minutes when the heat sinks reach stable operating temperature.
- 23. Now check the bias current by measuring DC voltage across resistor R9 and R26 (82.5 ohm), it should be about 1.70Vdc. Check DC voltage across resistor R11 and R28, it should be about 1.9Vdc.
- 24. Then check the DC voltage at J2 and J3 (PCM1794A 4x current output pins), it should be between 0.34Vdc to 0.37Vdc.
- 25. Connect a 1kHz digital signal to the SPDIF input socket. The PLL and either the 48k or 96k LED should be ON (depending on the sampling frequency of the input signal). You should hear the Relay click indicating that the board is un-muted and there should be 1kHz output signals at J13 and J14. Check output level using AC voltmeter, the output should be about 1.5Vrms at both channels. The channel imbalance of output level for left and right channel is due to the tolerance of PCM1794A output current. According to the PCM1794A data sheet, the maximum gain mismatch is 3% with a typical value of +/-0.5%. If the diyer wants to adjust the output level, two high resistance value resistor with same grade should be connected in parallel with the I/V resistors 475 ohm (R1/2 or R18/19 depending on where is the higher output level channel) at the bottom of the PCB. The value of the resistor should be determined by 'trial and error' starting from a minimum value of about 22k ohm.
- 26. Check that the distortion of the output 1KHz signal is about 0.02% for both channels.
- 27. Burn-in the DAC for about ½ hour to stabilize the old PIOs and other capacitors.
- 28. The digital input source is set by default to the RCA co-axial socket. However, to facilitate switching between the three digital input sources, a digital input selection switch is used. In the reference set, we have used a simple 2-pole 2-through 3-positions switch. The Digital Input Selection Circuit Diagram is below:



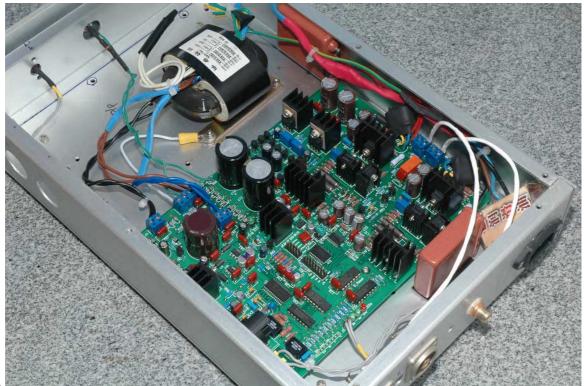






31.32. Photo of a full balance version rear panel.

33. Photo of a completed set in Stereo Mode is below: pins 2-3 on both J15 & J16 are shorted.

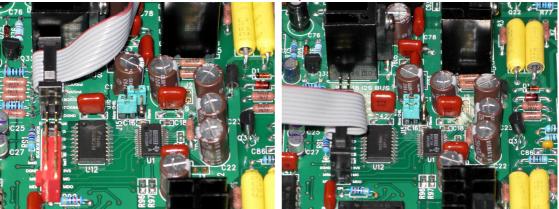


35. Photo of the connecting flat cable and the DAC in Balanced Mode is below: 5x2 pin header J6 from left side board (source master) connected to 8x2 pin header J4 plug on the right side board (slave).



37. Output capacitors: 0.01u K40Y-9//Silmic BP – custom made//10u PIO MBGO.

\*\* Note: The Russian Big Box 10uf PIO MBGO capacitor (brown boxes with the marking OTK) shown above is NOT part of the standard kit. For the single ended version, the standard output decoupling capacitors are Panasonic BP whereas for the fully balanced mode version, custom Silmic BP are provided as standard \*\*



- 39. Left side board: J15 short pin 1-2 and J16 short pin 2-3 Mono L mode.
- 40. Right side board: J15 short pin 1-2 and J16 short pin 1-2 Mono R mode.
- 41. Balanced I2S cable: Only required for full balance version of DAC.



Will add two circuit diagrams of SE and FB connections

## **Board Interface Specifications:**

#### 1. Power Supply Connectors:

| Item | Description        | Format |
|------|--------------------|--------|
| J9   | 17 to 18V ac, 0.5A | 10mm   |
| J10  | 17 to 18V ac, 0.5A | 10mm   |
| J11  | 8 to 9V ac, 0.5A   | 10mm   |
| J12  | Chassis Ground     | 10mm   |

#### 2. J4: External Digital Connector: (8 x 2 Pin Header: 100mil)

| Item          | Description               | Pin     | Format          |
|---------------|---------------------------|---------|-----------------|
| LRCK          | Work clock fs             | 1       | 12S             |
| SDATA         | Serial Digital Data       | 3       | 12S             |
| BCK           | Bit clock 64fs            | 5       | 12S             |
| SCK           | System clock 256fs        | 7       | I2S             |
| DGND          | Digital Ground            | 2, 4, 6 | Digital Ground  |
| Mute In       | Mute in for Output Signal | 8       | Active High     |
| ISELO         | Input Select 0            | 9       | See table 2     |
| ISEL1         | Input Select 1            | 10      | See table 2     |
| DGND          | Digital ground            | 11      | DGND            |
| 3V3           | 3v3 DC Supply             | 12      | Max 50mA        |
| SPI1 – MS_bar | SPI Latch                 | 13      | SPI for PCM1792 |
| SPI2 - MC     | SPI Clock                 | 14      | SPI for PCM1792 |
| SPI3 - MDI    | SPI Input                 | 15      | SPI for PCM1792 |
| SPI4 - MDO    | SPI Output                | 16      | SPI for PCM1792 |

<sup>\*</sup> All logic signal level CMOS 3.3V.

#### 3. Table 1: Sample Frequency Fs

| Sampling Frequency fs | SCK Frequency 256fs (MHz) |
|-----------------------|---------------------------|
| 32kHz                 | 8.192                     |
| 44.1kHz               | 11.2896                   |
| 48kHz                 | 12.288                    |
| 96kHz                 | 24.576                    |
| 192kHz                | 49.152                    |

#### 4. Table 2: Digital Input Select

| ISEL1   | ISEL0   | Description                        | On Board jumper J4         |  |
|---------|---------|------------------------------------|----------------------------|--|
| 0 (GND) | 0 (GND) | I2S via J4 (External I2S selected) | Short Pin 9-11 of J4       |  |
| 0 (GND) | 1 (3V3) | SPDIF RCA selected (default)       | All open (default)         |  |
| 1 (3V3) | 0 (GND) | AES XLR selected                   | Short pin 9-11 and pin 10- |  |
|         |         |                                    | 12 of J4                   |  |
| 1 (3V3) | 1 (3V3) | Optical selected                   | Short pin 10-12 of J4      |  |

<sup>\*\*</sup> SPI should be at 3.3V levels for PCM1792 only

#### 5. J6: CS8416 I2S Bus (5 x 2 pin header: 100mil)

| Item          | Description           | Pin           | 1/0           |
|---------------|-----------------------|---------------|---------------|
| LRCK          | Work clock fs         | 1             | From 8416     |
| SDATA         | Serial Data           | 3             | From 8416     |
| BCK           | Bit clock 64fs        | 5             | From 8416     |
| SCK           | System clock 256fs    | 7             | From 8416     |
| 8416 Mute Out | Mute signal from 8416 | 8             | 8416 Mute out |
| DGND          | Digital Ground        | 2, 4, 6, 9,10 | DGND          |

#### 6. Digital Input Socket:

| Туре              | Description         | Format             |
|-------------------|---------------------|--------------------|
| RCA – J8          | SPDIF input         | 75 ohm 24bit/192k  |
| XLR female - AES  | AES input           | 110 ohm 24bit/192k |
| Toslink - Optical | Optical input       | Optical 24bit/192k |
| Pin Header - J4   | I2S and SPI control | 3.3V CMOS          |

#### 7. Analogy Output Socket: J13 & J14

| Туре             | Description             | Format – 10mm J13 & J14    |
|------------------|-------------------------|----------------------------|
| RCA Left & Right | Analogy Output - Stereo | L–G (Left) and G–R (Right) |
| XLR - male       | Balance Analogy Output  | OUT+, G, OUT- (XLR)        |

<sup>\*\*</sup> For Mono L and R, set jumpers J15 and J16. XLR mode requires two boards.

#### 8. LED Display:

| LEDs for 8416 | Description  |
|---------------|--|
| Lock          | Digital signal is locked by 8416                       |
| 96k           | On when input signal is 96k to 192k Sampling Frequency |
| 48k           | On when input signal is 32k to 48k Sampling Frequency  |
| Mute          | Analogy signal muted by DAC and Relay - Error          |

Note that the LED is unable to tell Fs for external I2S input mode.

#### 9. For PCM1792 connection (for evaluation only)

- 1. Remove R96 and R97 100R SMD resistors
- 2. Connect SPI 4 signals at J4 pin 13 to pin 16. Also DGND at Pin 11. Pin 12 is 3v3 dc supply if necessary.
- 3. 3v3 CMOS logic levels.

#### 10. Transformer 40VA R-Core with shielding and safety approval: UL & CSA

- Primary:
- 115Vac x 2
- Secondary:
- 18Vac x 2, 0.5A
- 9Vac x 2, 0.5A (use only one winding)

#### **Attachments:**

- 1. PCM1794A DAC BOM (Bill of Material for full kit and balance board) 4 pages
- 2. Circuit Diagram 6 pages
- 3. PCB file 5 pages
- 4. FFT measurement 2 pages

~~~END~~~

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#### SE Kit - US\$350 PCM1794A Single End DAC Kit BOM

Rev 3 Item Reference Manufacturer Part Name Description Qty Supplier Part No PCB size 100u 6.3V SMD SSVP100M Sanvo OS-Con SVF ALUMINUM ELECTROLYTIC CAP C64 C69 3x11x2.5mm C15 C17 C19 C2 ALUMINUM ELECTROLYTIC CAP 604-1054-ND Digikey C22 C23 C72 Elna Silmic II 47uf 25V ALUMINUM ELECTROLYTIC CAP Digikey 604-1054-ND 8x11x3.5mm 47uF 6.3V SMD Sanyo OS-Con SVF C25 C27 C32 ALUMINUM ELECTROLYTIC CAP SSVP47M 5x11x2.5mm C49 C50 C77 C87 12uf 35\/ ALUMINUM ELECTROLYTIC CAP. x6x2.5mm 604-1065-ND 6 C4-5 C11-12 Elna Silmic II 100uf 35\ ALUMINUM ELECTROLYTIC CAP. 4 Digikey 10x11x5mm 245-46 100uf 35\ ALUMINUM ELECTROLYTIC CAP Digikey 12.5x25x5mm Elna Silmic II 667-EEU-FM1E101 Mouse Panasonic FM C51 C53 C76 C88 100uf 25\ ALUMINUM ELECTROLYTIC CAP 8x11x3.5mm arnell 8x11x3.5mm C52 C54 120uf 35V ALUMINUM ELECTROLYTIC CAP 661-KMH16VN103MT2 01 ALUMINUM ELECTROLYTIC Nippon Chemi-con KMH 22x30x1<u>0mm</u> 10 C71 or Panasonic TS-UP 10,000uf 16V 22x30mm CAP STV ECEC1CP103BA ALUMINUM ELECTROLYTIC 11 C73-74 5600uf 35V 22x35mm STV 2x35x10mm Panasonic Audio CAP 667-ECE-A1HN330U ALUMINUM ELECTROLYTIC Panasonic SU series Mouser C81-82 Samwha BP 33u 50V; 8x11.5mm CAP STV 10x11x5mm K40Y-9 0.01uf,10% 200V PIO K40Y-9 6x22mm 13 14 C83-84 PIO K40Y-9 6x22mm Axial Russian PIC ebay 2x5mm C1-2 C8-9 Russian PIC K40Y-9, 6800pF, 10% 200\ PIO K40Y-9 5x22mm Axial PIO K40Y-9 5x22mm ebay x25mm 15 C3 C10 Russian PIO K40Y-9, 1500pF,10% 200V PIO K40Y-9 5x22mm Axial ebay PIO K40Y-9 5x22mm x25mm C26 C28 C31 C34 C38 C40-44 C48 C55-56 C61-63 C65 C67 C68 C70 C75 Panasonic ECQ-V 0.047uf,10% 63V RADIAL FILM CAPACITOR 667-ECQ-V1J473JM C78-80 C89 C93-94 x5mm 17 C29 Epcos B32529 22nf, 5% 63V RADIAL FILM CAPACITOR SSP 2x5mm Acrotronic or Philips RADIAL FILM CAPACITOR C30 1nf, 5% 100\ 18 2x5mm C33 C37 C39 C47 C35 C36 0.01u, 20% 50V RADIAL Ceramic CAPACITOR RADIAL FILM CAPACITOR 19 MEPCO/Philips MLCO SSP K103M15Z5UF53H5 4 2x5mm SSP 20 Epcos B32529 0.1u, 63V 2x5mm 70pf, 20% 50V 21 22 SP K271J15COGFBAH5C MEPCO/Philips MLCC RADIAL Ceramic CAPACITOR 2x5mm C95-97 Panasonic ECQ-\ .33uf. 10% 50V RADIAL FILM CAPACITOR Mouser 667-ECQ-V1H334JL x5mm Russian or CDE Silve Film or Silver Mica to replace PIO 23 C57-60 C66 C85 RADIAL FILM CAPACITOR 0 Not Use 2x5mm Mica apacitors C6-7 C13-14 Epcos B32529 0.47u. 63V RADIAL FILM CAPACITOR SSP 2x5mm 4 C16 C18 C20 C24 Epcos, TDK or Murata SMD X7R 0603 0603X7R104KC16P07 Epcos 26 D1 D3 Vishay or NXP BAT85-T/R or BAT85S Schottky Diode 30V 200mA Farnell 1612329 2x10mm D20-21 D25 1N4148 1N4148 Semtech 100V 100mA diode 2x10mm 28 D2 D4 ZENER 6v8, 1W Axial ZENER-DIODE Semtech 6.8V Zene 2x10mm 29 D22-24 & J1 China LED, Green color x 6, Red x 1 LIGHT EMITTING DIODI LED oitch = 2.5mm PROGRAMMABLE PRECISION 30 D5-6 Fairchild M336-5V.TO-92 REFERENCE 5V Mouser 512-LM336Z5 TO-92 D7-19 Philips / Vishay BYV27-150 or BYV-200 13 78-BYV27-200 pitch = 10mm 31 DO-5 fast recovery Mouser HEATSINK\_SMALL, 630x600 mil 630 x 600 x 1000 mil (L x W x H) 32 H1-4 China 25mm Heatsink 15x16mmx25H 33 H5 H9 China HEATSINK\_MINI,600 x 900 mil 25mi Heatsink 600x900 mil 15x23mmx25H 34 H7 H11 China HEATSINK\_MINI,600 x 900 mil 30mm Heatsink 600x900 mil 15x23mmx30H H6 H8 H10 H12 35 China HEATSINK\_MINI,400 x 600 mil 21 m leatsink 400 x 600 mil 0x15mmx21H China 36 37 IC socket single row 8 pins PIN Socket .100 CENTERS 2.5mm pitch J2 J3 J5 Not Use 0 Not Use Not use Not Use Not Use Not Use 8x2 PIN HEADER; 100 MIL 38 J15-16 China HEADER16, Dual Row 3x2 CENTERS SSP 2.5mm pitch 8x2 PIN HEADER; 100 MIL 39 China HEADER16, Dual Row 8x2 CENTERS SSP .5mm pitch 5x2 PIN HEADER; 100 MIL 40 China HEADER10, Dual Row 5x2 CENTERS SSP 2.5mm pitch XLR Female Socket PCB (LR FEMALE ,NC3FAA-H-2 Horizontal 568-NC3FAAH-2 NC3FAAH2 Neutrik Mouse RCA Socket PCB horizontal RCA Socket Horzontal 10x10mm GENERIC 2 PIN SIP HEADER J9-14 China CON-SIP-2P-CHINA, Screw type 2 p 200 CENTERS (5MM) mm pitch Relay 2P2T 12V 44 K1 NFC RLY-NEC-EC2,12Vdc IND-MOLDED,47uH Mouser 551-EC2-12SNJ 5x10mm 45 L1-4 Murata or others Radial inductors 100mA type 47uH 2.5x10mm IND-MOLDED, Bead Radial inductors Bead type 8 .5x10mm 46 China Bead Q1-2 Q7-8 Q13-16 **TOSHIBA** 2SA1358.Y grade PNP Driver Transistor 8 SZG 2SA1358\ 2.5mm pitch MOSFET N CHANN POWER IRF610,TO-220 type 48 Q17 200V 1.8A ws IRF610 TO-220 MOSFET P CHAN 200V 1.8A 49 Q18 IRF9610,TO-220 type IRF9610 50 Q19-20 Q25-26 TOSHIBA 2SK30A.TO-92 N-CHANNEL, LOW NOISE JFET 4 2SK30A TO-92 51 Q21-22 Q29-30 TOSHIBA 2SC2240,BL grade TO-92 LOW NOISE NPN TRANSISTOR 2SC2240B TO-92 AS970,BL grade TO-92 53 Q31-35 SC1815.TO-92 OW NOISE NPN TRANSISTOR 2SC1815 TO-92 54 Q3-6 Q9-12 **TOSHIBA** 2SC3421,Y grade NPN Driver TRANSISTOR 8 STV 2SC3421Y 2.5mm pitch RES-1/4W,1k21,1% 71-CMF551K2100FHEK Vishay - Dale eaded Resistor 1/4W Mouse R1-2 R18-19 Vishay - Dale Metal Film Mouser 56 RES-1/4W.475R.1% Leaded Resistor 1/4W 4 71-CMF55475R00FHEK 2.5x10mm RES-1/4W,470R,1% Leaded Resistor 1/4W RES-2W 120 1W 5% R13 R30 71-CCF02-J-120 58 Vishay - Dale eaded Resistor 2W CCF02120RJKR36 Mouser 3.8x14mm 71-CMF6049R900FKEK 59 R14 R31 Vishay - Dale RES-1/2W,49R9 1/2W 1/4W,1% Leaded Resistor 1/2W or 1/4W Mouse 71-CMF5549R900FHEK 3.8x14mm 71-CMF60150R00FHE 60 R15 R32 RES-1/2W,150R 1/2W,1% Vishay - Dale Leaded Resistor 1/2W Mouser 3.8x14mm 61 R16-17 R33-34 Vishay - Dale RES-1/2W 4R99 19 eaded Resistor 1/4W Mouser 71-RN55D-F-4 99 .5x10mm 71-CMF5510K000FHEK 62 R3 R20 R35 Vishav - Dale RES-1/4W.10k0.1% Leaded Resistor 1/4W Mouser 2.5x10mm R41-42 R60-61 R68 63 69 R73-74 R82 Metal Film RES-1/4W,10k,1% Leaded Resistor 1/4W 9 Bell 2.5x10mm R39 R40 R43 R49 eaded Resistor 1/4W R77-78 R84-85 Metal Film RES-1/4W,100R,1% 71-CMF55562R00FHEK 65 R4-5 R21-22 Vishay - Dale RES-1/4W,562,1% Leaded Resistor 1/4W Mouser 2.5x10mm R45-46 R59 R62 Metal Film RES-1/4W.4k7.1% eaded Resistor 1/4W R66 R72 R83 R87 8 Bell 2.5x10mm RES-1/4W,15k,1% R47-48 67 Metal Film Leaded Resistor 1/4W 2.5x10mm

eaded Resistor 1/4W

2.5x10mm

R50-54 R57-58 R75

R81 R88-92

Metal Film

RES-1/4W,47k,1%

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| 89   85.56   Metal Film   RES-14W,880,1%   Leaded Resistor 14W   2   Bell   2.5x10mm   71   R823 864   Vishay - Dale   RES-14W,581,1%   Leaded Resistor 14W   5   Mouser   71-CMF\$5380100FHEK   2.5x10mm   72   R87   Vishay - Dale   RES-14W,75R,1%   Leaded Resistor 14W   5   Mouser   71-CMF\$5380100FHEK   2.5x10mm   72   R87   Vishay - Dale   RES-14W,75R,1%   Leaded Resistor 14W   1   Mouser   71-CMF\$538000FHEK   2.5x10mm   73   R70-71   Vishay - Dale   RES-14W,100k,1%   Leaded Resistor 14W   2   Mouser   71-CMF\$538020FHEK   2.5x10mm   74   R74   R | Item | Reference          | Manufacturer         | Part Name                         | Description                         | Qty | Supplier | Part No                 | PCB size    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------|----------------------|-----------------------------------|-------------------------------------|-----|----------|-------------------------|-------------|
| Transparage        | 69   |                    |                      |                                   | Leaded Resistor 1/4W                |     |          |                         |             |
| R87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 70   | R6 R23 R64         | Vishay - Dale        | RES-1/4W,3k01,1%                  | Leaded Resistor 1/4W                | 3   | Mouser   | 71-CMF553K0100FHEK      | 2.5x10mm    |
| R70-71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 71   | R36-38 R63 R65     | Vishay - Dale        | RES-1/4W,75R,1%                   | Leaded Resistor 1/4W                | 5   | Mouser   | 71-CMF5575R000FHEK      | 2.5x10mm    |
| T4   R7-8 R24-25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 72   | R67                | Vishay - Dale        | RES-1/4W,90.9R,1%                 | Leaded Resistor 1/4W                | 1   | Mouser   | 71-RN55D-F-90.9         | 2.5x10mm    |
| The content of the      | 73   | R70-71             | Vishay - Dale        | RES-1/4W,100k,1%                  | Leaded Resistor 1/4W                | 2   | Mouser   | 71-CMF55100K00FHEK      | 2.5x10mm    |
| Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 74   | R7-8 R24-25        | Vishay - Dale        | RES-1/4W,3k32,1%                  | Leaded Resistor 1/4W                | 4   | Mouser   | 71-CMF553K3200FHEK      | 2.5x10mm    |
| Fig. 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                    |                      |                                   |                                     |     |          | 71-CMF6010R000FKEK      |             |
| R96-97                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 75   | R79-80             | Vishay - Dale        | RES-1/4W,10R,1%                   | Leaded Resistor 1/4W                | 2   | Mouser   | 71-RN55D-F-10           | 2.5x10mm    |
| T1-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 76   | R9 R11 R26 R28     | Vishay - Dale        | RES-1/4W,82.5,1%                  | Leaded Resistor 1/4W                | 4   | Mouser   | 71-CCF55-82.5           | 2.5x10mm    |
| T1-2   MIDCOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 77   | R96-97             | ASJ                  | RES-1/8W,100R,1%                  | SMD 0805                            | 2   | ASJ      | CR21-1000-FL            | 0805        |
| TEXAS INSTRUMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                    |                      |                                   | MIDCOM 51698-LF3 SPDIF              |     |          |                         |             |
| Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 78   | T1-2               | MIDCOM               | 51698-LF3                         | PULSE TRANSFORMER                   | 2   | Midcom   | 51698-LF3               | 5x10mm      |
| CCTAL BUFFERLINE DRIVER 3   1   Mouser   512-74VHC244M   SOIC20   STATE OUTPUTS   1   Mouser   512-74VHC244M   SOIC20 wide   STATE OUTPUTS     |      |                    |                      |                                   |                                     |     |          |                         |             |
| 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 79   | U1                 | TEXAS INSTRUMENTS    | PCM1794A,SSOP28                   | 24 bit Digital to Analogy Converter | 1   | Mouser   | 595-PCM1794ADB          | SSOP28      |
| 81 U2   Cirrus Logic Crystal   CS8416CSZ_SOIC28   Digital receiver192k   1   Avnet   CS8416-CSZ   SOIC28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                    |                      |                                   | OCTAL BUFFER/LINE DRIVER 3          |     |          |                         |             |
| 81 U2   Cirrus Logic Crystal   CS8416CSZ_SOIC28   Digital receiver192k   1   Avnet   CS8416-CSZ   SOIC28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 80   | U12                | Fairchild            | 74VHC244M,SOIC20                  | STATE OUTPUTS                       | 1   | Mouser   | 512-74VHC244M           | SOIC20 wide |
| B2 U3 TOSHIBA   TORX147LF,T   OPTICAL RECEIVER 3.3V Cmos   1 Mouser   757-TORX147LFT   TORX147                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 81   | U2                 | Cirrus Logic Crystal | CS8416CSZ,SOIC28                  |                                     | 1   |          |                         | SOIC28      |
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                    | ,                    | ·                                 |                                     |     |          |                         |             |
| 83         U4 U14         NXP or Ti         74HC00N,DIP14         GATE         2         WS         74HC00N         DIP14           84         U5 U13         NXP or Ti         74HC02N,DIP14         QUAD 2-INPUT POS-NOR GATE         2         WS         SN74HC02N         DIP14           85         U7 U11         Toshiba         TA7805S         5 VOLT, VOLTAGE REGULATOR         2         SZG         TA7805S         TO-220           86         U8-10         AMS         AMS1117-3.3,SOT-223         3.3V Regulator         3         WS         1117-3.3V         SOT223           87         VR1-2         China Sichun         VRES-TOP-ADJ,500         ADJUST TYPE)         2         SZ         2.5mm pitch           88         VR3-4         China Sichun         VRES-TOP-ADJ,5K         ADJUST TYPE)         2         SZ         2.5mm pitch           89         M_PCB         China         PCM1794V2PCB         1.6mm; size 6 x 8 in         1         YML         PCM1794V2PCB         6x8 inches           90         M_Binder post         China         M3 threaded x 10mm         M3 threaded x 10mm         6         SZ           91         M_Insulation To-220         China         Insulation plastice washer TO-220         2         S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 82   | U3                 | TOSHIBA              | TORX147LF,T                       | OPTICAL RECEIVER 3.3V Cmos          | 1   | Mouser   | 757-TORX147LFT          | TORX147     |
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                    |                      | ,                                 | QUAD 2-INPUT POS-NAND               |     |          |                         | _           |
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 83   | U4 U14             | NXP or Ti            | 74HC00N.DIP14                     | GATE                                | 2   | ws       | 74HC00N                 | DIP14       |
| Stock   Stoc     |      |                    |                      | ·                                 |                                     |     |          |                         |             |
| Stock   Stoc     | 84   | U5 U13             | NXP or Ti            | 74HC02N.DIP14                     | QUAD 2-INPUT POS-NOR GATE           | 2   | ws       | SN74HC02N               | DIP14       |
| 86 U8-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                    |                      | ,                                 |                                     |     |          |                         |             |
| 86 U8-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 85   | U7 U11             | Toshiba              | TA7805S                           | 5 VOLT. VOLTAGE REGULATOR           | 2   | SZG      | TA7805S                 | TO-220      |
| VR1-2   China Sichun   VRES-TOP-ADJ,500   ADJUST TYPE   2   SZ   2.5mm pitch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                    |                      | AMS1117-3.3,SOT-223               |                                     |     |          |                         |             |
| VR3-4   China Sichun   VRES-TOP-ADJ,5K   ADJUST TYPE    2   SZ   2.5mm pitch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                    |                      |                                   |                                     |     |          |                         |             |
| VR3-4   China Sichun   VRES-TOP-ADJ,5K   ADJUST TYPE    2   SZ   2.5mm pitch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 87   | VR1-2              | China Sichun         | VRES-TOP-ADJ.500                  | ADJUST TYPE)                        | 2   | sz       |                         | 2.5mm pitch |
| 88         VR3-4         China Sichun         VRES-TOP-ADJ,5K         ADJUST TYPE)         2         SZ         2.5mm pitch           89         M_PCB         China         PCM1794V2PCB         1.6mm; size 6 x 8 in         1         YML         PCM1794V2PCB         6x8 inches           90         M_Binder post         China         M3 threaded x 10mm         M5 threaded x 10mm         6         SZ           91         M_Insulation To-220         China         Insulation sheet TO-220         1nsulation sheet TO-220         2         SZ           92         M_Plastic washer         China         Insulation plastice washer TO-220         2         SZ           93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 x 12mm plastic screw         M3 x 12mm plastic screw         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         M3 x 12mm plastic screw         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         Box         Box         Box         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                    |                      | ·                                 | VARIABLE RESISTOR (TOP              |     |          |                         |             |
| 89         M_PCB         China         PCM1794V2PCB         1.6mm; size 6 x 8 in         1         YML         PCM1794V2PCB         6x8 inches           90         M_Binder post         China         M3 threaded x 10mm         6         SZ             91         M_Insulation To-220         China         Insulation sheet TO-220         2         SZ            92         M_Plastic washer         China         Insulation plastice washer TO-220         2         SZ            93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ            94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         Box         1         SZ           98         P_Carton         China         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 88   | VR3-4              | China Sichun         | VRES-TOP-ADJ,5K                   |                                     | 2   | SZ       |                         | 2.5mm pitch |
| 90         M_Binder post         China         M3 threaded x 10mm         M3 threaded x 10mm         6         SZ           91         M_Insulation To-220         China         Insulation sheet TO-220         Insulation sheet TO-220         2         SZ           92         M_Plastic washer         China         Insulation plastice washer TO-220         Insulation plastice washer TO-220         2         SZ           93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                    |                      | ·                                 | PCB 1794 DAC FR4 double side        |     |          |                         |             |
| 90         M_Binder post         China         M3 threaded x 10mm         M3 threaded x 10mm         6         SZ           91         M_Insulation To-220         China         Insulation sheet TO-220         Insulation sheet TO-220         2         SZ           92         M_Plastic washer         China         Insulation plastice washer TO-220         Insulation plastice washer TO-220         2         SZ           93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 89   | M PCB              | China                | PCM1794V2PCB                      | 1.6mm; size 6 x 8 in                | 1   | YML      | PCM1794V2PCB            | 6x8 inches  |
| 91         M_Insulation To-220         China         Insulation sheet TO-220         2         SZ           92         M_Plastic washer         China         Insulation plastice washer TO-220         Insulation plastice washer TO-220         2         SZ           93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 90   | M Binder post      |                      | M3 threaded x 10mm                |                                     | 6   |          |                         |             |
| 92         M_Plastic washer         China         Insulation plastice washer TO-220         Insulation plastice washer TO-220         2         SZ           93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         ESD bag         1         SZ           98         P_Carton         China         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 91   |                    | China                |                                   |                                     | 2   |          |                         |             |
| 93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      | _                  |                      |                                   |                                     |     |          |                         |             |
| 93         M_Screw         China         M3 x 10 or M3 x 12 mm         M3 x 10         8         SZ           94         M_Screw         China         M3 x 6         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 92   | M_Plastic washer   | China                | Insulation plastice washer TO-220 | Insulation plastice washer TO-220   | 2   | SZ       |                         |             |
| 94         M_Screw         China         M3 x 6         10         SZ           95         M_Washer         China         M3 Spring washer         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 93   |                    | China                |                                   |                                     | 8   |          |                         |             |
| 95         M_Washer         China         M3 Spring washer         M3 Spring washer         18         SZ           96         M_Screw         China         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         1         SZ           98         P_Carton         China         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                    |                      |                                   |                                     |     |          |                         |             |
| 96         M_Screw         China         M3 x 12mm plastic screw         M3 x 12mm plastic screw         3         Bell         M3 x 12mm plastic screw           97         P_Bubble Bag ESD         China         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 95   |                    |                      | M3 Spring washer                  | M3 Spring washer                    |     |          |                         |             |
| 97         P_Bubble Bag ESD         China         ESD bag         1         SZ           98         P_Carton         China         Box         Box         1         SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                    |                      |                                   |                                     |     |          | M3 x 12mm plastic screw |             |
| 98 P_Carton China Box Box 1 SZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                    |                      |                                   |                                     |     |          | ,                       | İ           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                    |                      |                                   |                                     | 1   |          |                         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 99   | Input select cable | China                | 4-pin, wire and 2P2T3P switch     | 4-pin, wire and 2P2T3P switch       | 1   |          | Pins. Wires and SW      | İ           |

Part Count 354

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## FB Upgrade Kit - US\$300 PCM1794A Full Balance DAC Upgrade Kit BOM (Full Balance DAC requires both the SE Kit and FB Upgrade Kit)

(Full Balance DAC requires both the SE Kit and FB Upgrade Kit) Rev Item Reference Manufacturer Part Name Qty Supplier Part No PCB size Description 100u 6.3V SMD SSVP100M Sanvo OS-Con SVF ALUMINUM ELECTROLYTIC CAP C64 3x11x2.5mm C15 C17 C19 C2 ALUMINUM ELECTROLYTIC CAP 604-1054-ND Digikey C22 C23 C72 Elna Silmic II 47uf 25V ALUMINUM ELECTROLYTIC CAP Digikey 604-1054-ND 8x11x3.5mm C49 C50 C7 12uf 35V ALUMINUM ELECTROLYTIC CAP Panasonic F 5x6x2.5mm C4-5 C11-12 ALUMINUM ELECTROLYTIC 604-1065-ND 100uf 35\ Digike 10x11x5mm 6 C45-46 Elna Silmic II 100uf 35V ALUMINUM ELECTROLYTIC CAP Digikey 604-1065-ND 12.5x25x5mm Mouse 667-EEU-FM1E101 C51 C53 C76 C88 Panasonic FM 100uf 25V ALUMINUM ELECTROLYTIC CAP Farnell 1219466 8x11x3.5mm 667-EEU-FC1V101 Panasonic FC ALUMINUM ELECTROLYTIC CAP. 8 C52 C54 120uf 35V Mouser 8x11x3.5mm Mouser 661-KMH16VN103MT2 or Nippon Chemi-con KMH or Panasonic TS-UP 0,000uf 16V 22x30mm ALUMINUM ELECTROLYTIC CAP 2x30x10mm 10 5600uf 35V 22x35mi ALLIMINUM ELECTROLYTIC CAR STV 22x35x10mm 11 C81-82 Elna Silmic II 47u 35V or 100u 35V ALUMINUM ELECTROLYTIC CAP 8 Mouse 604-1065-ND 10x11x5mm PIO K40Y-9 6x22mm K40Y-9 0.01uf,10% 200V ebay 13 C1-2 C8-9 Russian PIC K40Y-9, 6800pF, 10% 200V PIO K40Y-9 5x22mm Axial ebav PIO K40Y-9 5x22mm 5x25mm 14 (40Y-9, 1500pF,10% 200V PIO K40Y-9 5x22mm Axia 34 C38 C42-44 C55-56 C61-63 C65 C67 C75 C78-80 Panasonic ECQ-V RADIAL FILM CAPACITOR C89 C93-94 0.047uf.10% 63V 19 Mouse 667-ECQ-V1J473JM x5mm RADIAL Ceramic CAPACITOR
RADIAL FILM CAPACITOR 16 MEPCO/Philips MLCC K271J15COGFBAH5C 270pf, 20% 50V 2x5mm C95-97 17 Panasonic ECQ-V .33uf. 10% 50V 667-ECQ-V1H334J 2x5mm Russian or CDE Silver Film or Silver Mica to replace PIO C57-60 C66 C85 RADIAL FILM CAPACITOR Not Use x5mm Epcos B32529 19 C6-7 C13-14 0.47u. 63V RADIAL FILM CAPACITOR 4 SSP 2x5mm 0603X7R104KC16P07 0.1u, 10% 50V C16 C18 C20 C24 Epcos, TDK or Murata 20 MD X7R 0603 Epcos 0603 D1 D3 /ishay or NXP Schottky Diode 30V 200mA BAT85-T/R or BAT85S 2v1∩mm Farnell 1612329 D20-21 D25 22 Semtech 1N4148 100V 100mA diode 1N4148 2x10mm ZENER 6v8, 1W Axial ZENER-DIODE 6.8V Zene Semtech 2x10mm D22-24 China LED,Green color x 3 LIGHT EMITTING DIODI \_ED oitch = 2.5mm PROGRAMMABLE PRECISION 25 D5-6 Fairchild \_M336-5V.TO-92 REFERENCE 5V 2 512-LM336Z5 TO-92 Mouser 26 D7-19 Philips / Vishav BYV27-150 or BYV-200 DO-5 fast recovery 13 Mouser 78-BYV27-200 pitch = 10mm HEATSINK\_SMALL, 630x600 mil 630 x 600 x 1000 mil (L x W x H) 27 H1-4 China -leatsink 15x16mmx25H 28 H5 H9 China HEATSINK\_MINI,600 x 900 mil 25mm Heatsink 600x900 mil 15x23mmx25H China HEATSINK\_MINI,600 x 900 mil 30mi Heatsink 600x900 mi 5x23mmx30H H6 H8 H10 H12 China HEATSINK\_MINI,400 x 600 mil 21mr Heatsink 400 x 600 mil 10x15mmx21H Not Use Not Use Not Use 8x2 PIN HEADER; 100 MIL 32 J15-16 China HEADER16, Dual Row 3x2 CENTERS SSP .5mm pitch 8x2 PIN HEADER: 100 MII HEADER16, Dual Row 8x2 CENTERS SSP 33 China 2.5mm pitch GENERIC 2 PIN SIP HEADER J9-14 CON-SIP-2P-CHINA, Screw type 2 pi 200 CENTERS (5MM) 5mm pitch 551-EC2-12SN Radial inductors Bead type PNP Driver Transistor L5 L6 L8-12 IND-MOLDED.Bead 2.5x10mm 2SA1358 Q1-2 Q7-8 Q13-16 TOSHIBA 2SA1358,Y grade 8 2.5mm pitch MOSFET N CHANN POWER IRF610 38 Q17 IRF610.TO-220 type 200V 1.8A WS TO-220 MOSFET P CHAN 200V 1.8A 39 IRF9610,TO-220 type TO-220 Q18 IRF9610 WS 2SK30A,TO-92 40 Q19-20 Q25-26 TOSHIBA N-CHANNEL, LOW NOISE JFET 2SK30A TO-92 2SC2240,BL grade TO-92 LOW NOISE NPN TRANSISTOR 41 Q21-22 Q29-30 TOSHIBA 2SC2240BI TO-92 LOW NOISE PNP TRANSISTOR TO-92 Q23-24 Q27-28 TOSHIBA 2AS970,BL grade TO-92 2SA970BI 43 Q31-35 **FOSHIBA** 2SC1815,TO-92 LOW NOISE NPN TRANSISTOR SC1815 TO-92 44 TOSHIBA NPN Driver TRANSISTOR STV Q3-6 Q9-12 2SC3421,Y grade 2SC3421\ 8 2.5mm pitch 45 R10 R12 R27 R29 Vishay - Dale RES-1/4W.1k21.1% Leaded Resistor 1/4W Mous 71-CMF551K2100FHFK 46 R1-2 R18-19 Vishay - Dale RES-1/4W,475R,1% Leaded Resistor 1/4W 4 Mouse 71-CMF55475R00FHEK 2.5x10mm Metal Film RES-1/4W,470R,1% eaded Resistor 1/4W RES-2W 120 1W 5% 48 R13 R30 71-CCF02-J-120 Vishay - Dale eaded Resistor 2W Mouse 3.8x14mm 71-CMF6049R900FKEK RES-1/2W.49R9 1/2W 1/4W.1% 71-CMF5549R900FHEK 49 R14 R31 Vishav - Dale eaded Resistor 1/2W or 1/4W Mouser .8x14mm 50 R15 R32 Vishay - Dale RES-1/2W,150R 1/2W,1% Leaded Resistor 1/2W 71-CMF60150R00FHEK 3.8x14mm Mouser 51 R16-17 R33-34 Vishay - Dale RES-1/2W.4R99.1% Leaded Resistor 1/4W Mouse 71-RN55D-F-4.99 2.5x10mm 71-CMF5510K000FHE R3 R20 R3 Vishay - Dale RES-1/4W,10k0,1% Leaded Resistor 1/4W Mouse .5x10mm R41-42 R60-61 R68-9 69 R73-74 R82 Metal Film RES-1/4W.10k.1% eaded Resistor 1/4W .5x10mm 5-1/4W,100R,1% Metal Film Leaded Resistor 1/4W .5x10mm 71-CMF55562R00FHEK 55 R4-5 R21-22 Vishay - Dale RES-1/4W.562.1% eaded Resistor 1/4W Mouse R45-46 R59 R62 R66 R72 R83 R87 RES-1/4W.4k7.1% Metal Film eaded Resistor 1/4W .5x10mm 57 R47-48 Metal Film RES-1/4W,15k,1% Leaded Resistor 1/4W Bell 2.5x10mm R75 R88 Metal Film RES-1/4W,47k,1% Leaded Resistor 1/4W 2.5x10mm .5x10mm 59 R55-56 Metal Film RES-1/4W,680,1% Leaded Resistor 1/4W Rell 71-CMF553K0100FHEK 60 R6 R23 Vishay - Dale RES-1/4W,3k01,1% Leaded Resistor 1/4W Mouser .5x10mm 61 R70-71 RES-1/4W,100k,1% Leaded Resistor 1/4W Mouser 71-CMF55100K00FHEK Vishay - Dale .5x10mm Mouse 71-CMF553K3200FHE 62 R7-8 R24-25 Vishay - Dale RES-1/4W,3k32,1% Leaded Resistor 1/4W 2.5x10mm R9 R11 R26 R RES-1/4W,82.5,19 Leaded Resistor 1/4W 63 Vishay - Dale Mouse 2.5x10mn R96-97 RES-1/8W,100R,1% CR21-1000-FL 65 595-PCM1794ADB SSOP28 TEXAS INSTRUMENTS PCM1794A,SSOP28 OCTAL BUFFER/LINE DRIVER 3 66 U12 74VHC244M,SOIC20 512-74VHC244M SOIC20 wide Fairchild STATE OUTPUTS Mouse QUAD 2-INPUT POS-NAND DIP14 U14 NXP or Ti 74HC00N,DIP14 WS 74HC00N 68 GATE QUAD 2-INPUT POS-NOR GATE U13 NXP or Ti 74HC02N.DIP14 ws SN74HC02N DIP14 69

VOLT, VOLTAGE REGULATOR

TA7805S

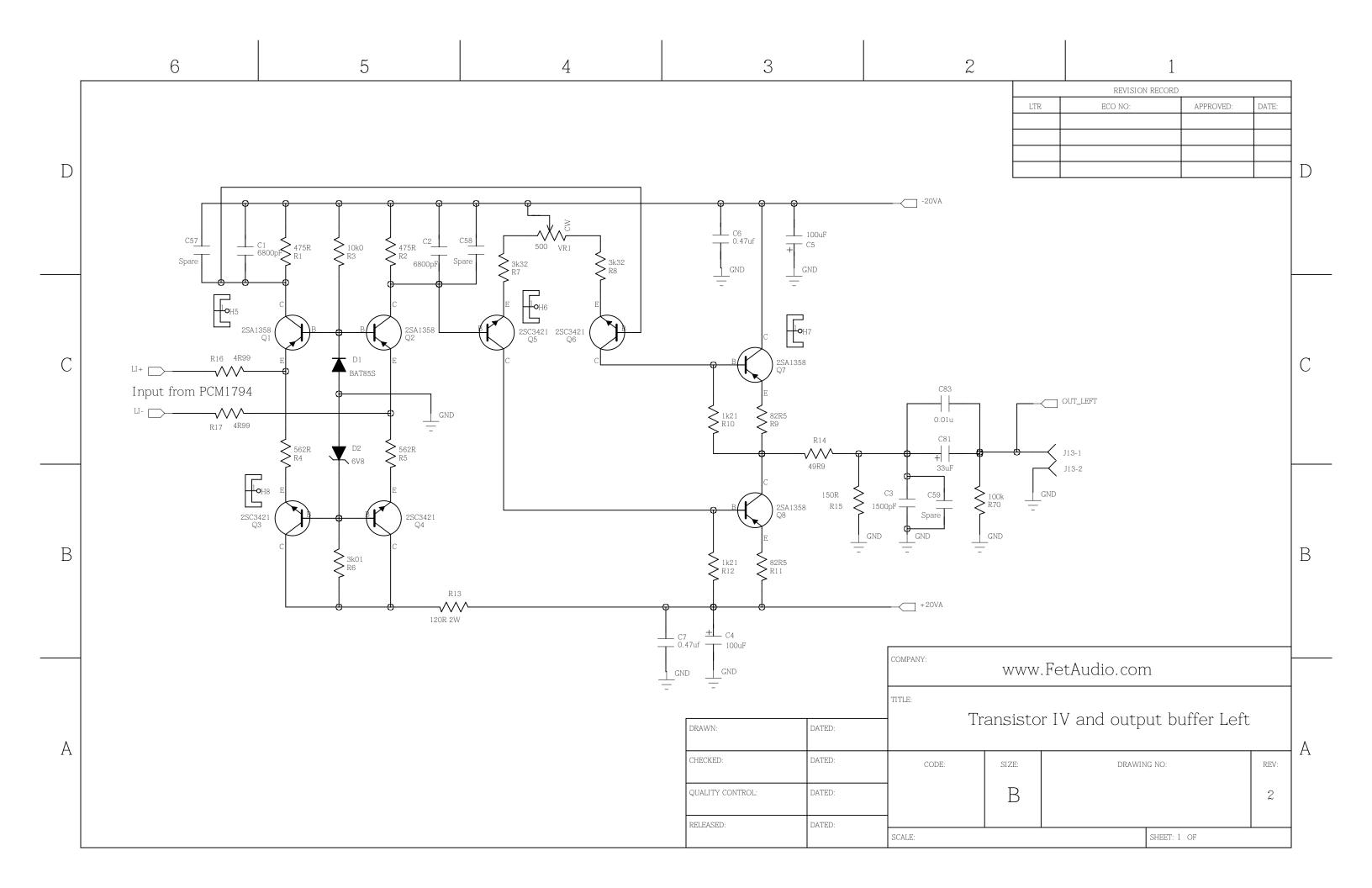
U8-9

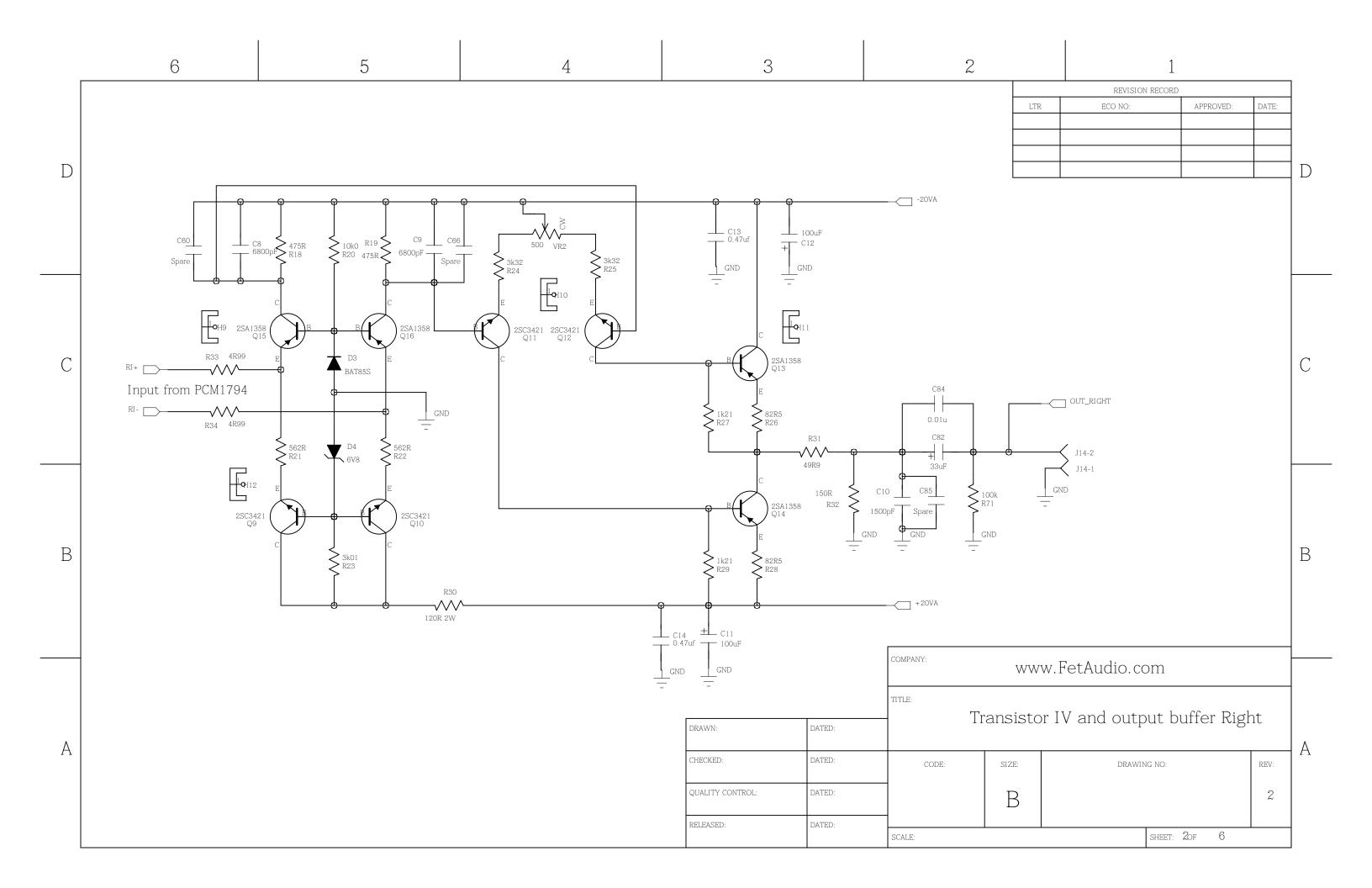
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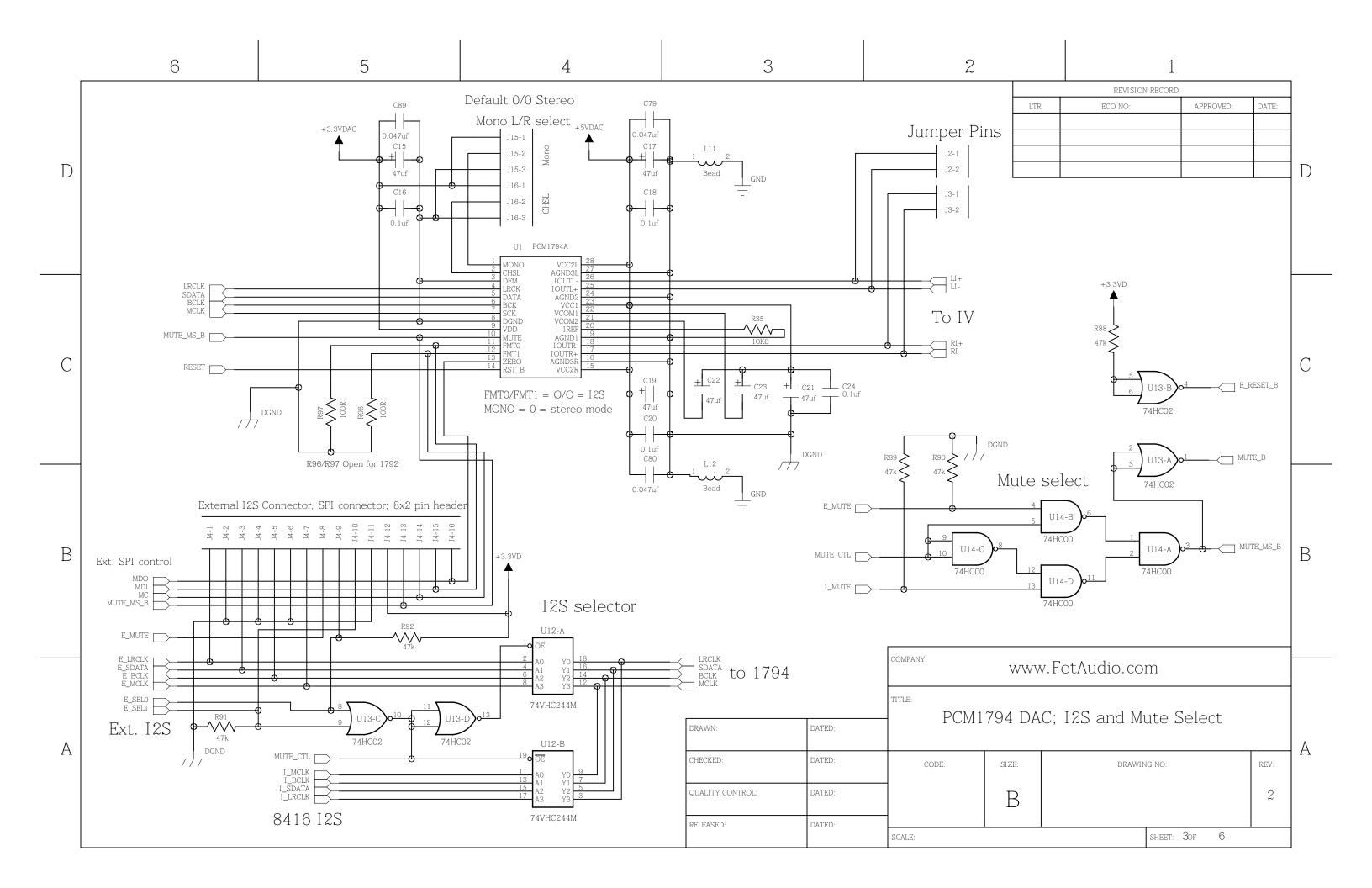
| Item | Reference           | Manufacturer | Part Name                         | Description                       | Qty | Supplier   | Part No                    | PCB size      |  |
|------|---------------------|--------------|-----------------------------------|-----------------------------------|-----|------------|----------------------------|---------------|--|
|      |                     |              |                                   | VARIABLE RESISTOR (TOP            |     |            |                            |               |  |
| 72   | VR1-2               | China Sichun | VRES-TOP-ADJ,500                  | ADJUST TYPE)                      |     | SZ         | 1                          | 2.5mm pitch   |  |
|      |                     |              |                                   | VARIABLE RESISTOR (TOP            |     |            |                            |               |  |
| 73   | VR3-4               | China Sichun | VRES-TOP-ADJ,5K                   | ADJUST TYPE)                      | 2   | SZ         |                            | 2.5mm pitch   |  |
|      |                     |              |                                   | PCB 1794 DAC FR4 double side      |     |            |                            |               |  |
| 74   | M_PCB               | China        | PCM1794V2PCB                      | 1.6mm; size 6 x 8 in              | 1   | YML        | PCM1794V2PCB               | 6x8 inches    |  |
| 75   | M_Binder post       | China        | M3 threaded x 10mm                | M3 threaded x 10mm                | 6   | SZ         |                            |               |  |
| 76   | M_Insulation To-220 | China        | Insulation sheet TO-220           | Insulation sheet TO-220           | 2   | SZ         |                            |               |  |
|      |                     |              |                                   |                                   |     |            |                            |               |  |
| 77   | M_Plastic washer    | China        | Insulation plastice washer TO-220 | Insulation plastice washer TO-220 | 2   | SZ         |                            |               |  |
| 78   | M_Screw             | China        | M3 x 10 or M3 x 12 mm             | M3 x 10                           | 8   | SZ         |                            |               |  |
| 79   | M_Screw             | China        | M3 x 6                            | M3 x 6                            | 10  | SZ         |                            |               |  |
| 80   | M_Washer            | China        | M3 Spring washer                  | M3 Spring washer                  | 18  | SZ         |                            |               |  |
| 81   | P_Bubble Bag ESD    | China        | ESD bag                           | ESD bag                           | 1   | SZ         |                            |               |  |
| 82   | P_Carton            | China        | Box                               | Box                               | 1   | SZ         |                            |               |  |
|      |                     |              |                                   |                                   |     |            |                            | 5x2+8x2 heade |  |
| 83   | I2S Connector       | SGP China    | Connector 5x2 to 8x2 flat cable   | Connector 5x2 to 8x2 flat cable   | 1   | Suntronics | 10-wire flat cable + plugs | plugs         |  |
|      |                     |              |                                   | Part Count                        | 294 |            |                            |               |  |

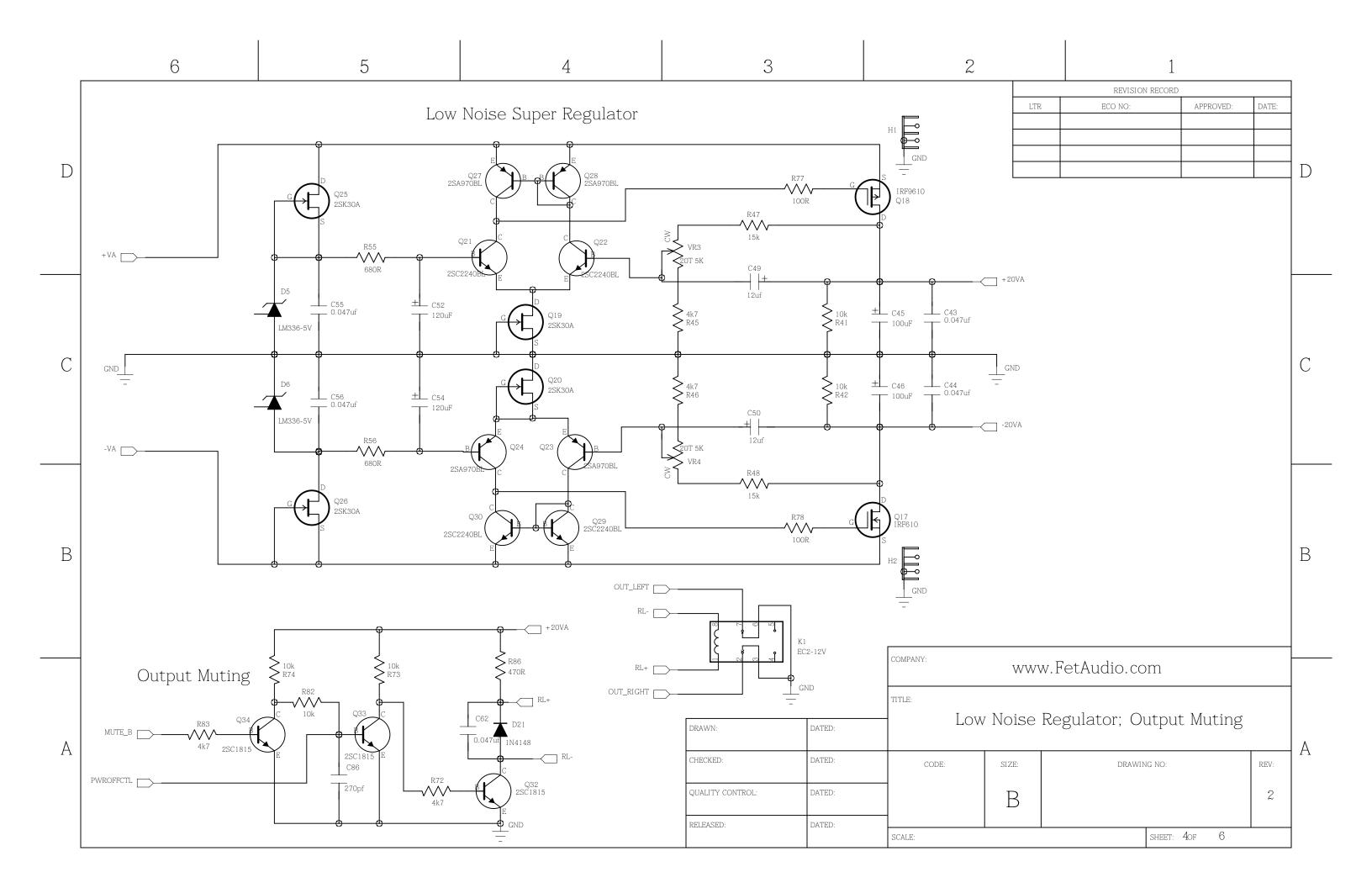
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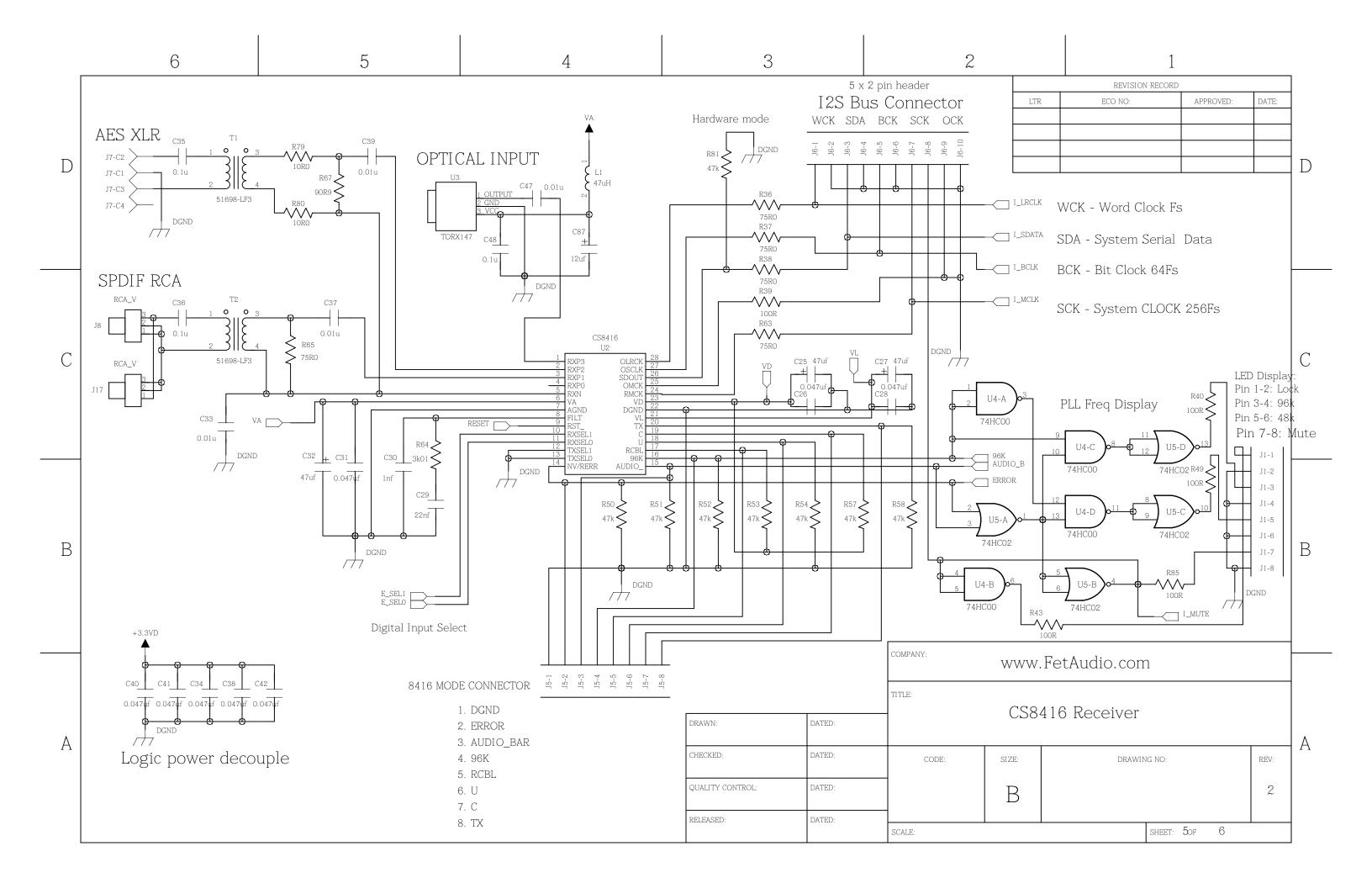
1. Item 11 BP capacitors will be replaced by 8 pcs Silmic II capacitors. These capacitors will be used at location C81 and C82 as a special Silmic II BP capacitors.

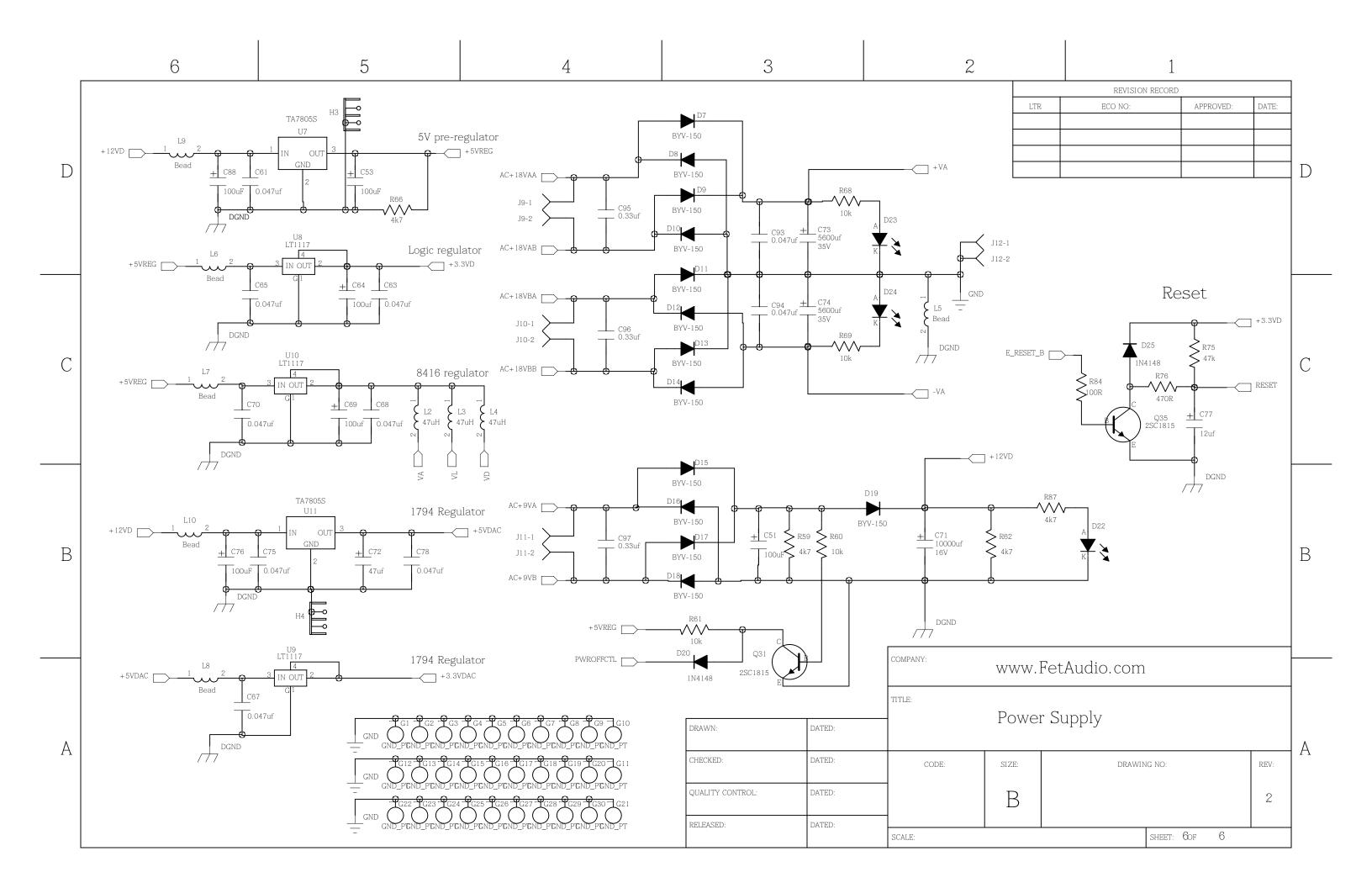


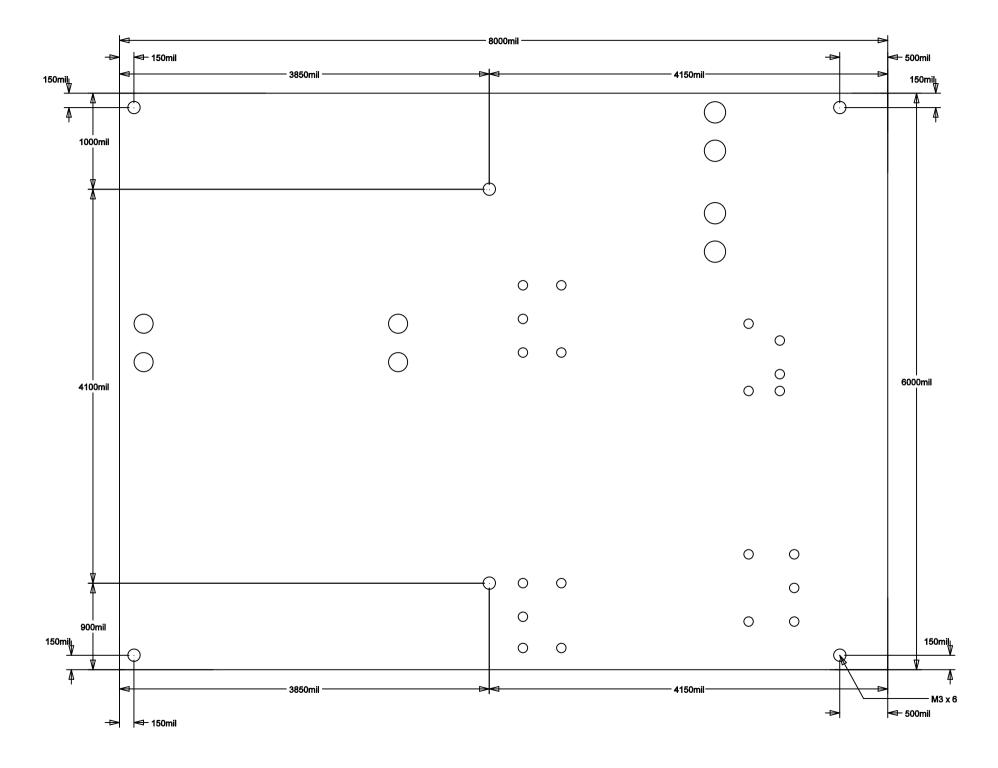


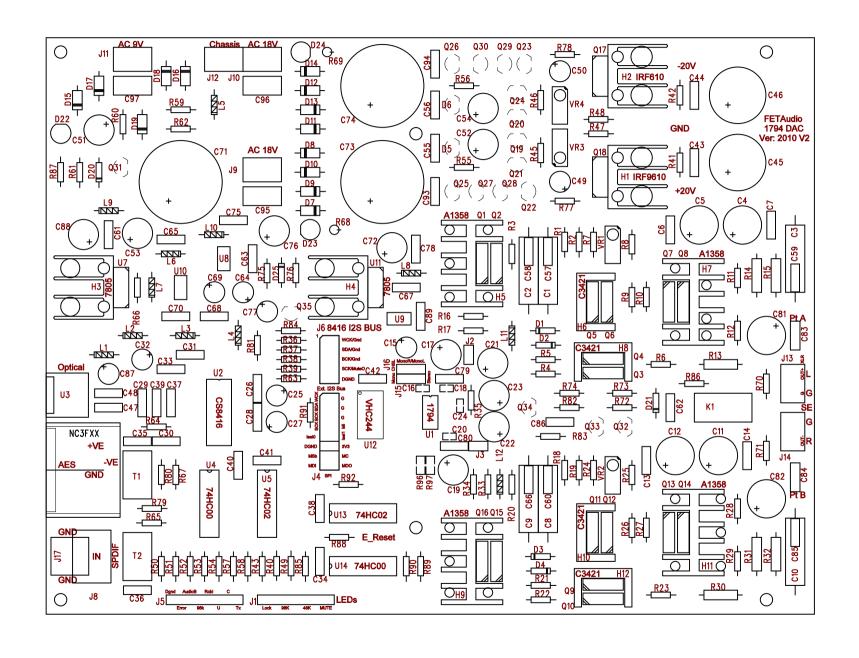


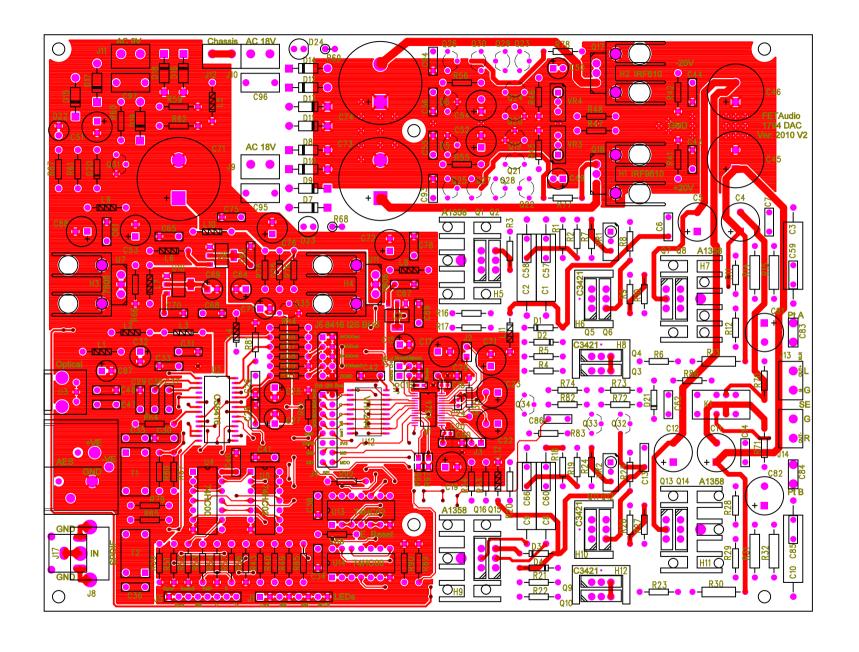


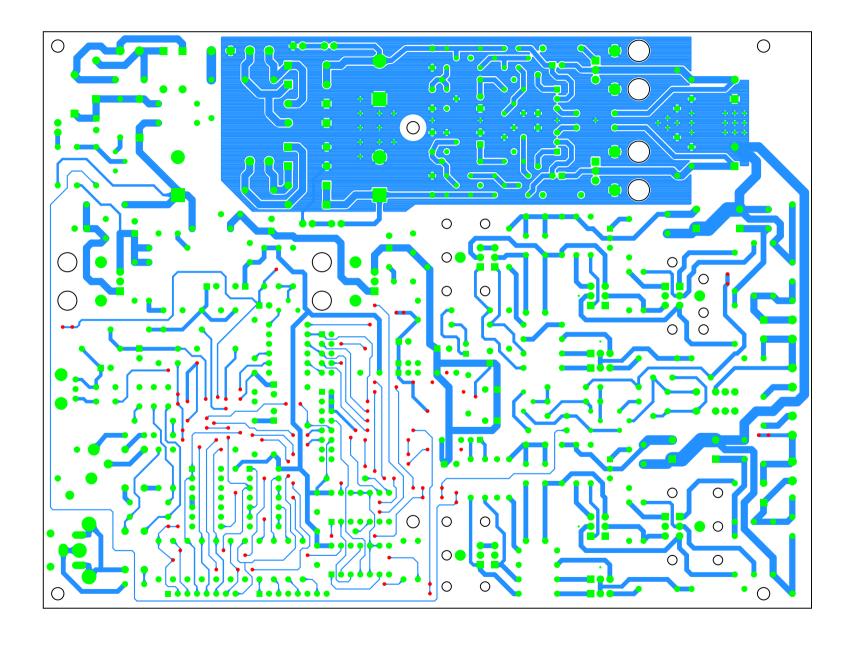


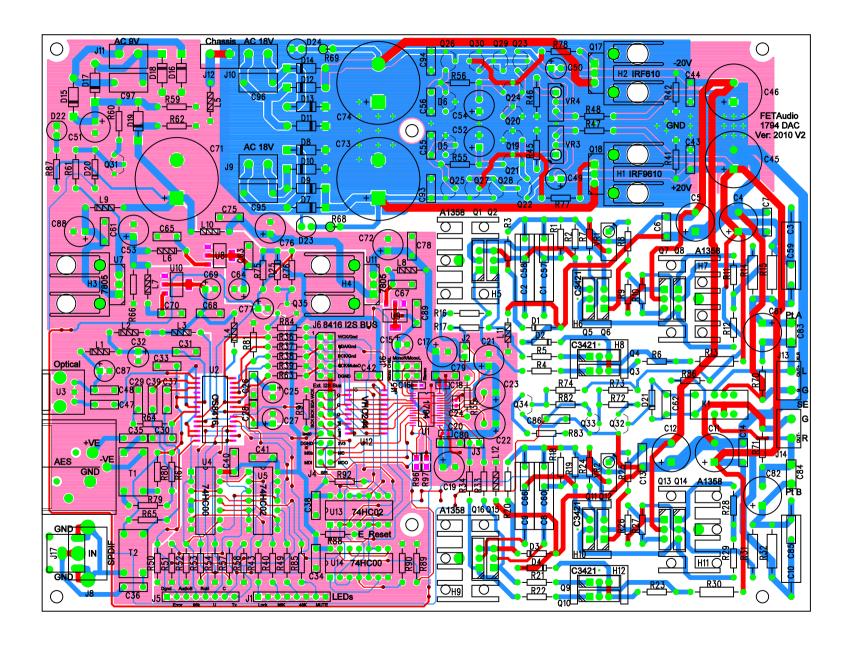




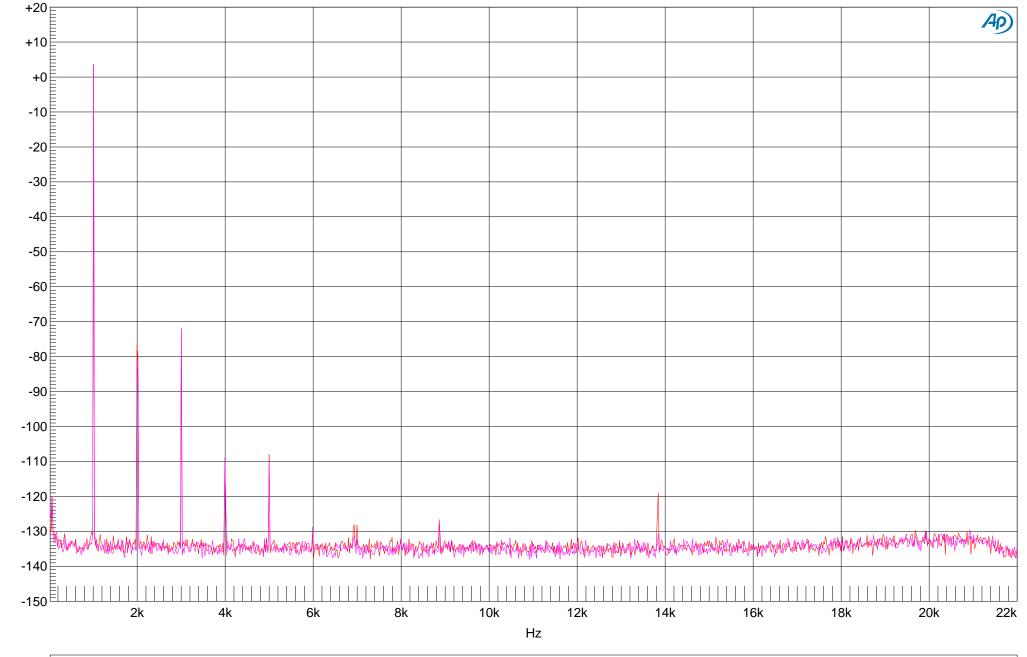




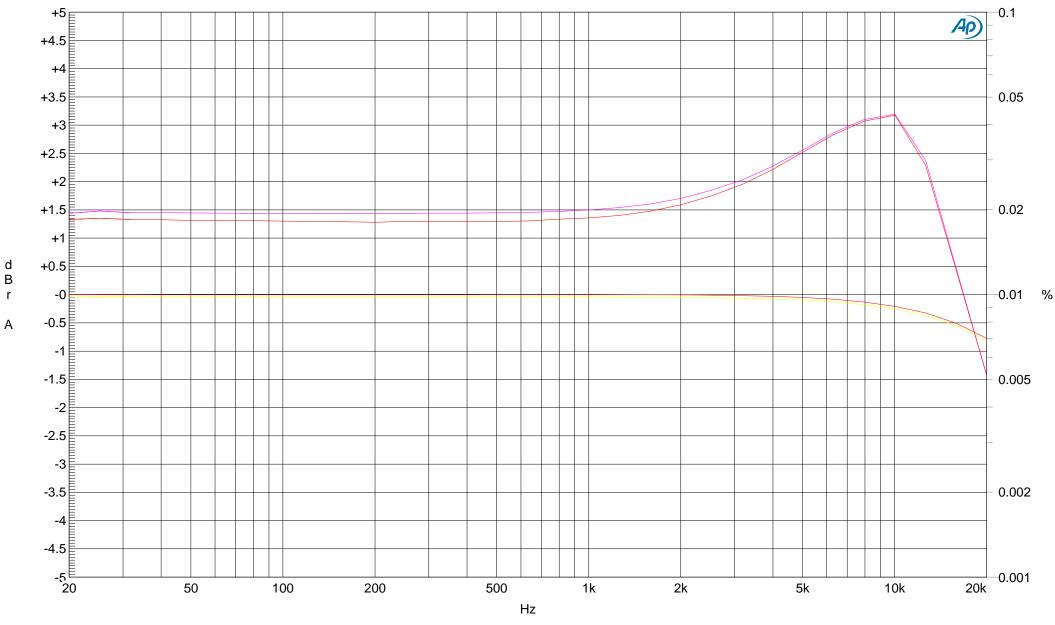




d B V



| Sweep | Trace | Color   | Line Style | Thick | Data          | Axis | Comment |
|-------|-------|---------|------------|-------|---------------|------|---------|
| 1     | 1     | Red     | Solid      | 1     | Fft.Ch.1 Ampl |      |         |
| 1     | 2     | Magenta | Solid      | 1     | Fft.Ch.2 Ampl | Left |         |



| Sweep | Trace | Color   | Line Style | Thick | Data             | Axis  | Comment |
|-------|-------|---------|------------|-------|------------------|-------|---------|
| 1     | 1     | Red     | Solid      | 1     | Anlr.Level A     | Left  |         |
| 1     | 2     | Magenta | Solid      | 1     | Anlr.THD+N Ratio | Right |         |
| 1     | 3     | Yellow  | Solid      | 1     | Anlr.Level B     | Left  |         |
| 1     | 4     | Red     | Solid      | 1     | Anlr.THD+N Ratio | Right |         |