

DSP5636XEVMMUM/AD
02/01
REV # 1.0

DSP5636XEVM

User's Manual

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**DSP56300 Family Manual
DSP563xx User's Manuals
Technical Data Sheets**

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Rev. 1.0; published 02/01
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About This Manual

This manual describes the functionality and use of the DSP5636XEVM (Evaluation Module).

The DSP5636XEVM supports the DSP56362, DSP56364, DSP56366, and DSP56367 processors. Motorola offers several different ROM software versions of the DSP56362, DSP56364, DSP56366, and DSP56367 processors that are supported with this EVM. The various ROM versions are available to support technologies from third party licenses, such as Dolby Laboratories™, DTS™, and others.

Note: To use the DSP56364, users must install an adaptor module into the EVM. This adapter can be ordered from a Motorola distributor with part number *DSP56364ADAPTER*.

Organization

This book is organized into 6 sections:

- Overview
- Setup and Operation
- Component Datasheets
- Schematics
- Bill of Materials
- Running the Passthrough Code

Suggested Reading

Additional reading that provides background for the information in this guide as well as general information about the Multimedia Architecture:

- IEC 958 Digital Audio Interface Standard
- DSP56367 User's Manual

Conventions

This document uses the following notational conventions:

- Messages displayed on screen and example code are presented in the `courier fixed-width` font.
- Information entered by users is shown in **bold** font.
- *File names, program names, and directories* are in italics.

SECTION 1

OVERVIEW

1.1 INTRODUCTION

The DSP5636XEVM supports the DSP56362, DSP56366, DSP56364, and the DSP56367 processors.

The following list describes the primary features of the DSP5636XEVM.

- 24-bit DSP5636x Digital Signal Processor operating at 120MHz.
- 256k x 24-bits of external SRAM and 128k x 8-bits of Flash ROM.
- One 20-bit stereo Analog-to-Digital converter (ADC), two 24-bit 6 channel Digital-to-Analog converters (DACs).
- RCA jacks for all analog audio input and output connections.
- Optical and transformer-isolated electrical S/PDIF stereo digital audio inputs and outputs.
- 50-pin expansion connector that provides capability for expansion and/or substitution of other input/output peripherals. This connector also simplifies interprocessor communication between other Motorola Evaluation Modules.
- MC68HC705C8 microcontroller that performs RS-232-to-OnCE port command conversions.
- Socketed DSP on the board for ease of changing the device.
- MC68HC908GP32 8 bit microcontroller for EVM initialization, LCD display and button controls.

The following figure shows the DSP5636XEVM block diagram.

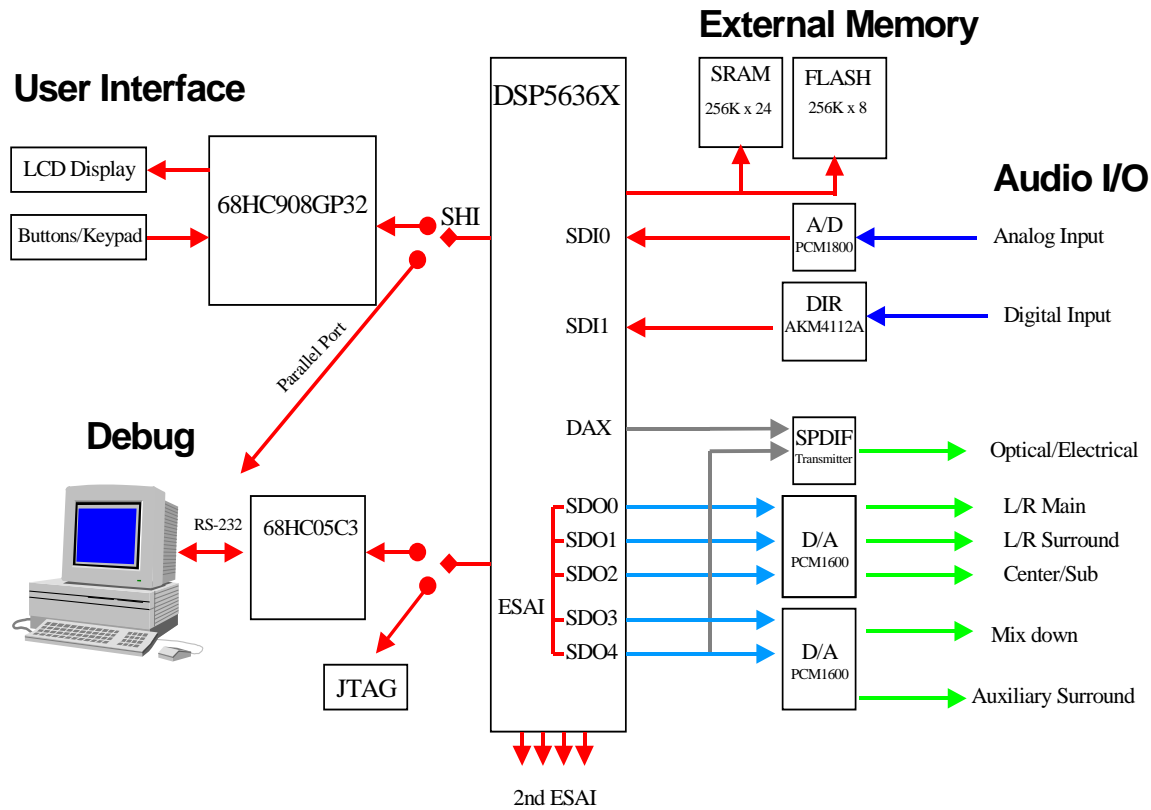


Figure 1-1 DSP5636XEVM Block Diagram

SECTION 2

SETUP AND OPERATION

2.1 SOFTWARE AND HARDWARE SETUP

This section describes the hardware setup and software installation which is required to load, run, and debug programs in the DSP.

2.1.1 SOFTWARE INSTALLATION

The Evaluation Module demonstration software consists of a Domain Technologies CD containing Windows™ style user interface debug software and demonstration/test code.

Use the following steps to install the software:

1. Insert the Domain Technologies CD into the CD-ROM drive.
2. Select and run the `setup.exe` program.
3. Select DSP563xxEVM from the menu.
4. Select Debug 56k from the menu.
5. A Software License Agreement will appear. To install EVM563xx, users must accept this agreement. Click on **Yes** from the menu.
6. A new screen will appear. Enter your **name** and **company**. Then click on **NEXT**.
7. Setup will install EVM563xx in the following directory:
C:\Program Files\DomTech\EVM563xx
Click on **NEXT**.
8. Setup will add program icons to the Program Folder. Users may enter a new folder name, or select one from the existing Folders list. Click on **NEXT** to continue.
9. Setup has enough information to start copying the program files. Click on **NEXT** to begin copying files.
10. The screen will clear and the Domain menu will appear. Click **EXIT**.

2.1.2 HARDWARE SETUP

Figure 2-1 shows the interconnection diagram for connecting the PC and the external power supply to the Evaluation Module board.

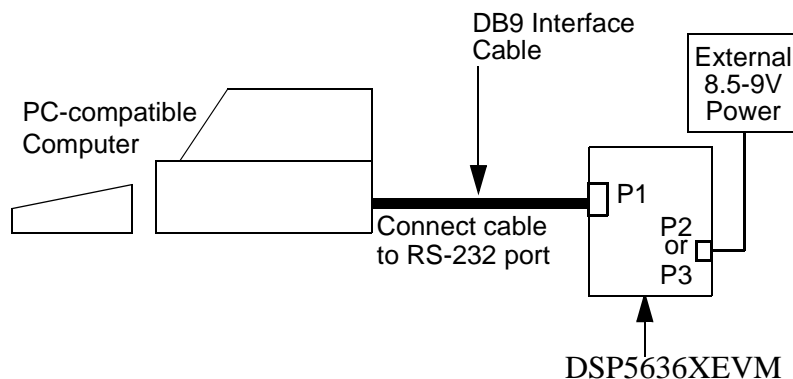


Figure 2-1 DSP5636XEVM Cable Connections

Several jumpers on the board are available to set up the correct modes and other hardware settings. The jumpers should be in the default configuration, as shown in Figure 2-2.

Note: It is critical that the DSP core voltage is set correctly using jumper JP14. Once the jumpers are set, use the following check list to proceed.

1. If a DSP56362 is installed on the board, then the jumper must be installed at pins 1 and 2 of JP29. If this is not done correctly, the DSP may not be properly grounded. In the case of a DSP56366 or a DSP56367 this jumper setting does not apply.
2. Set the DSP core voltage according to table 2-2. For example, for the DSP56362, the core voltage is 3.3v. You must set a jumper between pins 1-2 at JP14.
3. Connect the DB9P interface cable to the RS-232 port connection on the PC and P1 on the Evaluation Module board. This provides the connection that allows the PC to control board function.
4. Apply 8.5-9V AC/DC 1amp power to the P2 or P3 connector on the Evaluation Module board.
5. The green Power LED will light when power is correctly applied.

Table 2-1 Jumpers as Installed

Jumper	From	To	Jumper	From	To	Jumper	From	To
JP1	1	2	JP12	3	4	JP25	1	2
JP2	1	2		5	6	JP31	3	4
JP4	1	2		7	8	JP29	1	2
JP5	1	2		9	10			
JP26	1	2						
JP14	1	2		15	16			
				17	18			
JP27	1	2		19	20			
	5	6		21	22			
JP8	1	2		23	24			
	5	6		25	26			
	7	8		29	30			
				31	32			
				33	34			
				35	36			
				43	44			
			45	46				
			47	48				

The DSP core voltage can be either 3.3v or 1.8v. It is critical that the correct voltage is set for the type of DSP installed on the board.

Table 2-2 DSP Core Voltage Selection Jumper (JP14)

Core Voltage	JP14
3.3v	1-2
1.8v	2-3

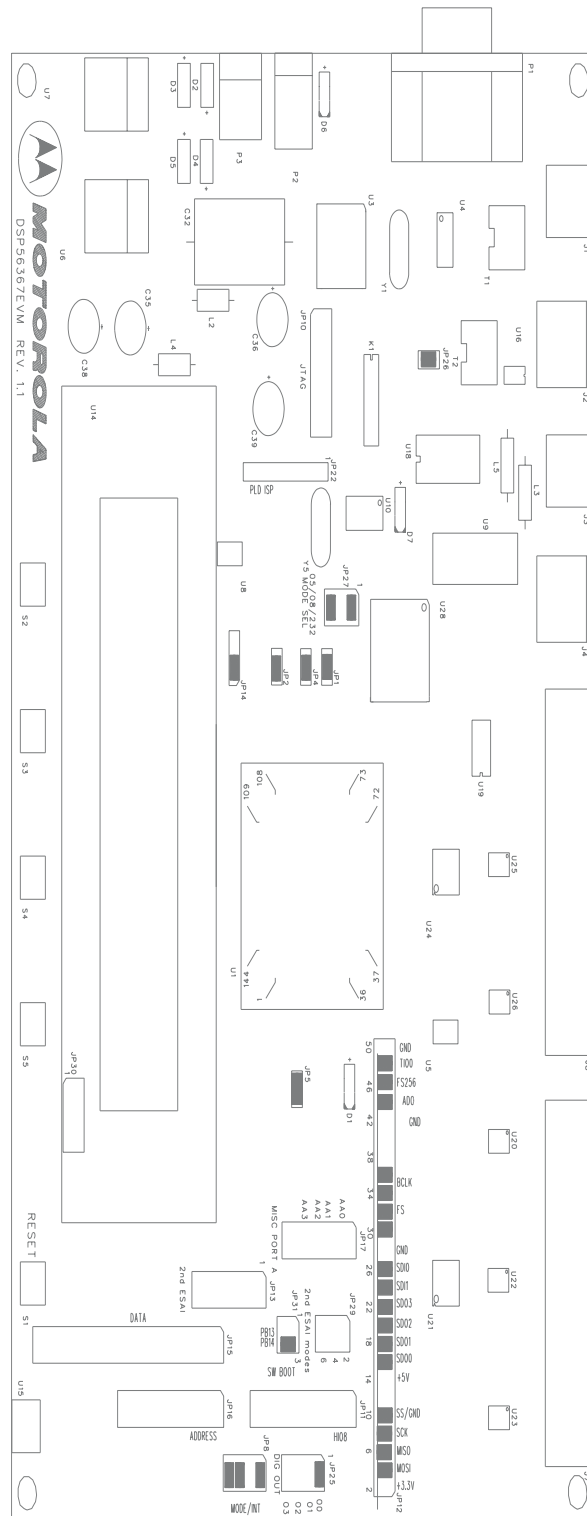


Figure 2-2 EVM Board Layout and Default Jumper Settings

2.2 SYSTEM DESCRIPTION

This section describes some of the component blocks within the DSP5636XEVM such as the memory interface, A/D converter, and the D/A converters. For detailed information on the specific components, such as the SPDIF receiver at U10, refer to the manufactures data sheet.

2.2.0.1 Debug Interface

The JTAG/Once port of the DSP can be accessed using the standard Motorola toolset through the 14 pin header (JP10) on the board. Connect the command converter hardware provided by Motorola or a third party to this header to use the debug tools.

The on-board command converter also allows debugging using the JTAG/OnCE port. In this case, the Domain Debugger software is used. The RS-232/OnCE interface receives the serial data from the RS-232 transceiver and executes commands sent by the host computer. These commands perform the following:

- Reset the DSP
- Put the DSP in debug mode
- Release the DSP from debug mode
- Read and write to the OnCE port
- Read and write to the DSP

The RS-232 serial communication is performed in software on the MC68HC705 microcontroller. To use this port, connect a DB9 serial cable from a PC to the DB9 (P1) on the Evaluation Module.

If the 14 pin JTAG/ONCE port is to be used for debugging, users must ensure that the serial DB9 connector at P1 is not connected. Similarly, the 14 pin connector at JP10 must not be attached if the Domain debugger is used.

2.2.1 EXTERNAL MEMORY

The external memory port of the DSP is interfaced to a 256x24 bit Fast Static RAM chip and to a 256x8 Flash ROM.

Select the SRAM by configuring the DSP's address attribute register to assert the AA2 line. To keep the address stable during the entire bus cycle, insert a minimum of 1 wait state to the bus operation.

Select the EPROM by configuring the DSP's address attribute register to assert the AA1 line. This Flash memory will be written to from the DSP.

Note: The software required for writing to the flash is not currently completed. This feature will be added in a future revision.

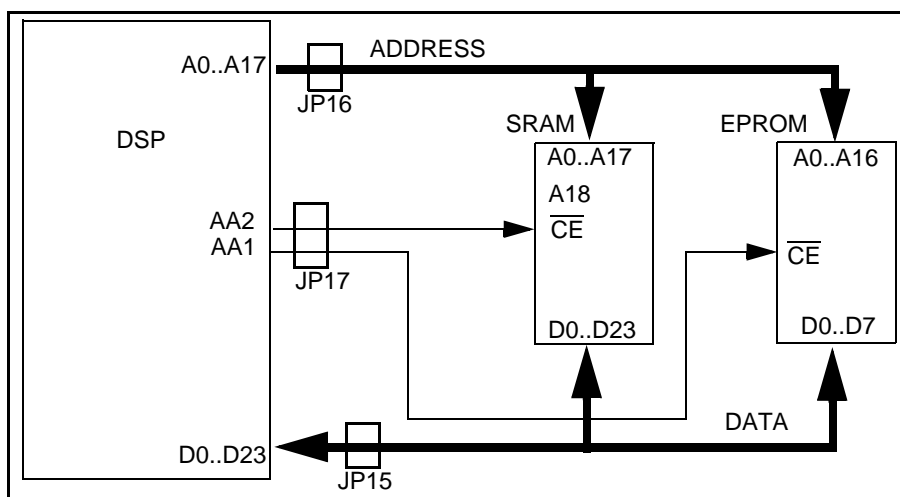


Figure 2-3 External Memory Interface Diagram

2.2.2 ANALOG I/O

The Evaluation Module has two analog input channels (Left and Right), and eight analog output channels. Two additional channels can be added in future revisions bringing the total up to two input and ten output channels.

The following lists show the current configuration for the EVM. The I/O connector is shown in Figure 2-4.

2.2.2.1 Analog Output Channels

- Left (L)
- Right (R)
- Center (C)
- Subwoofer (S)
- Left Surround (LS)
- Right Surround (RS)

- Auxiliary channel 1 (Laux)
- Auxiliary channel 2 (Raux)
- Not implemented (Laux2)
- Not implemented (Raux2)

2.2.2.2 Analog Input channels

- Left analog input (Lin)
- Right analog input (Rin)

2.2.3 A/D CONVERTER

The A/D converter is clocked by the AKM4112A digital receiver. The analog input is routed using the AKM4112A. When the PLL of the AK4112A is unlocked, the digital clocks are derived from the 12.288Mhz clock connected to the AKM4112A. This means that the sampling rate is 48Khz and other rates are not supported for A/D operation.

The following operational procedure is used.

2.2.3.1 A/D Operational Procedure

1. If a valid SPDIF digital input is present at J1, then this digital signal is sent to the DSP through the SDI1 input of the ESAI. In this case, the analog signal at Rin and Lin at J8 will not be selected. This condition is verified if the LED at D7 is illuminated, which indicates valid digital signal at J1.
2. If a valid SPDIF input is not present at J1, in which case D7 will not be lit, then the analog inputs at Lin and Rin at J8 will be selected. Then the AD output will be routed to the SDI1 of the ESAI of the DSP. For reliable operation of the A/D a digital signal at J1 should not connected.

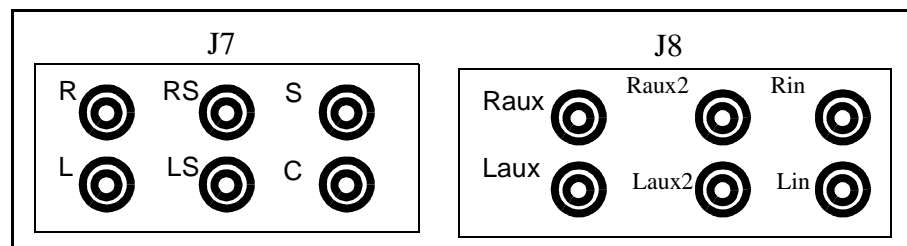


Figure 2-4 Analog I/O Connectors (Rear View of EVM)

2.2.4 DIGITAL I/O

The Evaluation Module has a coaxial input at J1 and an optical S/PDIF input at J2. To select between the optical or the electrical SPDIF input follow through the 'Setup' menu on the LCD display. However on some of the early releases of the DSP5636XEVM boards only the coaxial input is operational. The optical S/PDIF input may be available in the future as a software upgrade for the EVM. The EVM also has a set of coaxial outputs and an optical S/PDIF output. This set of outputs will be multiplexed between one of the ESAI output channels of the DSP or the Digital Audio Transmitter (DAX) port.

The selection between the DAX and the ESAI output of the DSP is determined by jumper JP26. Available jumper settings are shown in Table 2-3.

If the ESAI output is selected, then one of the ESAI ports, SDO0-SDO3, are selected according to the jumper set at JP25.

The S/PDIF transmitter receives data from the DSP on the serial data output SDOx line. The SDOx is configured by placing a jumper on the JP25 header as shown in Table 2-4.

Note: Only one jumper should be installed at JP25. If more than one jumper is installed, then two ESAI output lines will be driving each other.

Table 2-3 Digital SPDIF Output Source Selection Jumper (JP26)

JP 26 Pins 1-2	MODE
ON	ESAI output is transmitted
OFF	DAX output is transmitted

Table 2-4 S/PDIF Transmitter Serial Data Output

SDOx	JP25
SDO0	1-2
SDO1	3-4
SDO2	5-6
SDO3	7-8

The Evaluation Module supports digital coaxial I/Os, and optical I/Os. The primary set of digital outputs are connected to the DSP Digital Audio Transmitter (DAX). The secondary set

of digital outputs are connected to the S/PDIF transmitter. Figure 2-5 shows the digital input and output connector configuration.

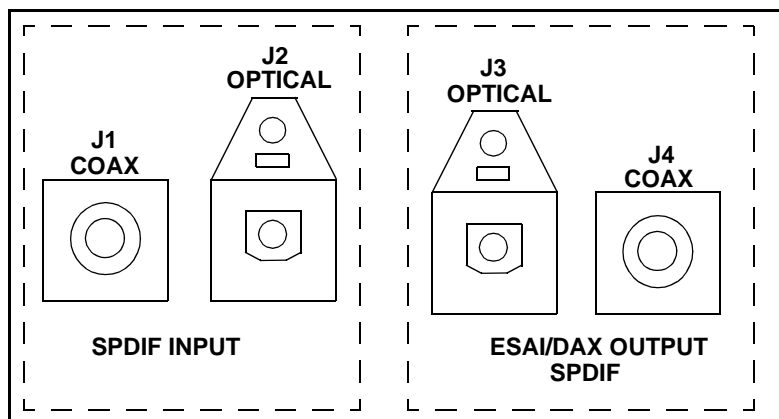


Figure 2-5 Digital I/O Connectors

2.2.5 DSP CLOCK

The DSP clock is derived from the 9.8304 Mhz oscillator Y6. The $\overline{\text{PINIT}}$ signal is tied low, which disables the PLL when it resets. Because of this, the PLL's multiplication factor must be configured in user software. If the multiplication factor is not set, the DSP operating clock is 4.9152Mhz. (One half of 9.8304Mhz).

2.3 HOST MICROCONTROLLER INTERFACE

The MC68HC908GP32 microcontroller is intended for host communication with the DSP, initialization of the EVM and for LCD control. However early release the DSP5636XEVM rev 1.1 is shipped without any host control features or LCD display features. The microcontroller is only used to initialize the AKM4112A SPDIF receiver and the two PCM1600 multichannel D/A converters. In the latter release of the DSP5636XEVM the microcontroller is configured with minimum functionality for configure the EVM's SPDIF input. Full functionality will be enabled in future revisions.

2.3.1 OPERATION MODE SELECTION

The DSP operating modes are selected by configuring JP8 to one of the modes shown in Table 2-5.

Table 2-5 DSP Operating Mode

MODE	DESCRIPTION	JP8			
		PINS 7-8 MODD	PINS 5-6 MODC	PINS 4-3 MODB	PINS 2-1 MODA
0	EXPANDED MODE	ON	ON	ON	ON
1	BOOTSTRAP FROM BYTE-WIDE MEMORY	ON	ON	ON	OFF
2	JUMP TO PROM STARTING ADDRESS	ON	ON	OFF	ON
5	BOOTSTRAP FROM SHI (SLAVE SPI MODE)	ON	OFF	ON	OFF
7	BOOTSTRAP FROM SHI (SLAVE I ² C MODE)	ON	OFF	OFF	OFF
8	EXPANDED MODE	OFF	ON	ON	ON
C	HI08 BOOTSTRAP IN ISA MODE	OFF	OFF	ON	ON
D	HI08 BOOTSTRAP IN MC68HC711 NON-MUX MODE	OFF	OFF	ON	OFF
E	HI08 BOOTSTRAP IN 8051 MUX BUS MODE	OFF	OFF	OFF	ON
F	HI08 BOOTSTRAP IN 68302 BUS MODE	OFF	OFF	OFF	OFF

Refer to the DSP56367 User’s Manual for a detailed description of the operating modes.

2.4 POWER SUPPLY

The Evaluation Module requires an input voltage of 8.5-9V at 1 amp for both analog and digital circuits. It has separate digital and analog power and ground planes and voltage regulators to output the +5V, -5V, +3.3V, and 1.8V supplies. The DC-DC converter outputs the -5V supply. When power is supplied to the 2.1mm power connector P2 or to the 2-pin terminal block P3, the green LED D8 is illuminated. The polarity of the voltage applied to the P3 terminal block is reversible because the power goes through a bridge rectifier.

Note: While the voltage regulators can accommodate higher input voltage potentials, the added heat dissipation required at these input voltage levels results in the regulator becoming dangerously warm. It is recommended that users do not subject the board to power inputs in excess of 12V.

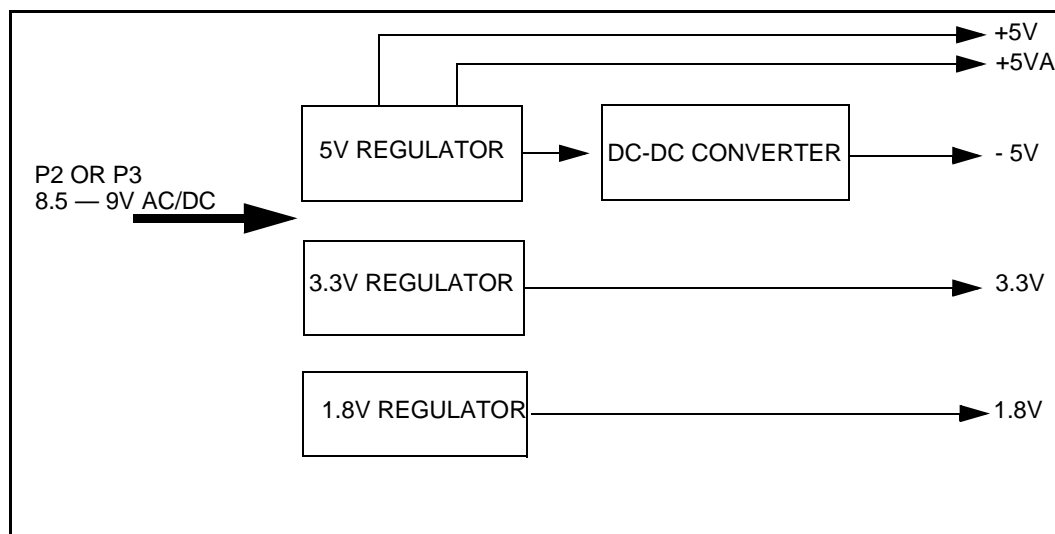


Figure 2-6 Evaluation Module Power Supply Diagram

SECTION 3

COMPONENT DATASHEETS

3.1 DOCUMENTATION

Documentation for the audio components can be downloaded from the manufacturer websites shown in the following table. The Motorola web site for the appropriate manuals is:

<http://www.mot.com/pub/SPS/DSP/LIBRARY/>

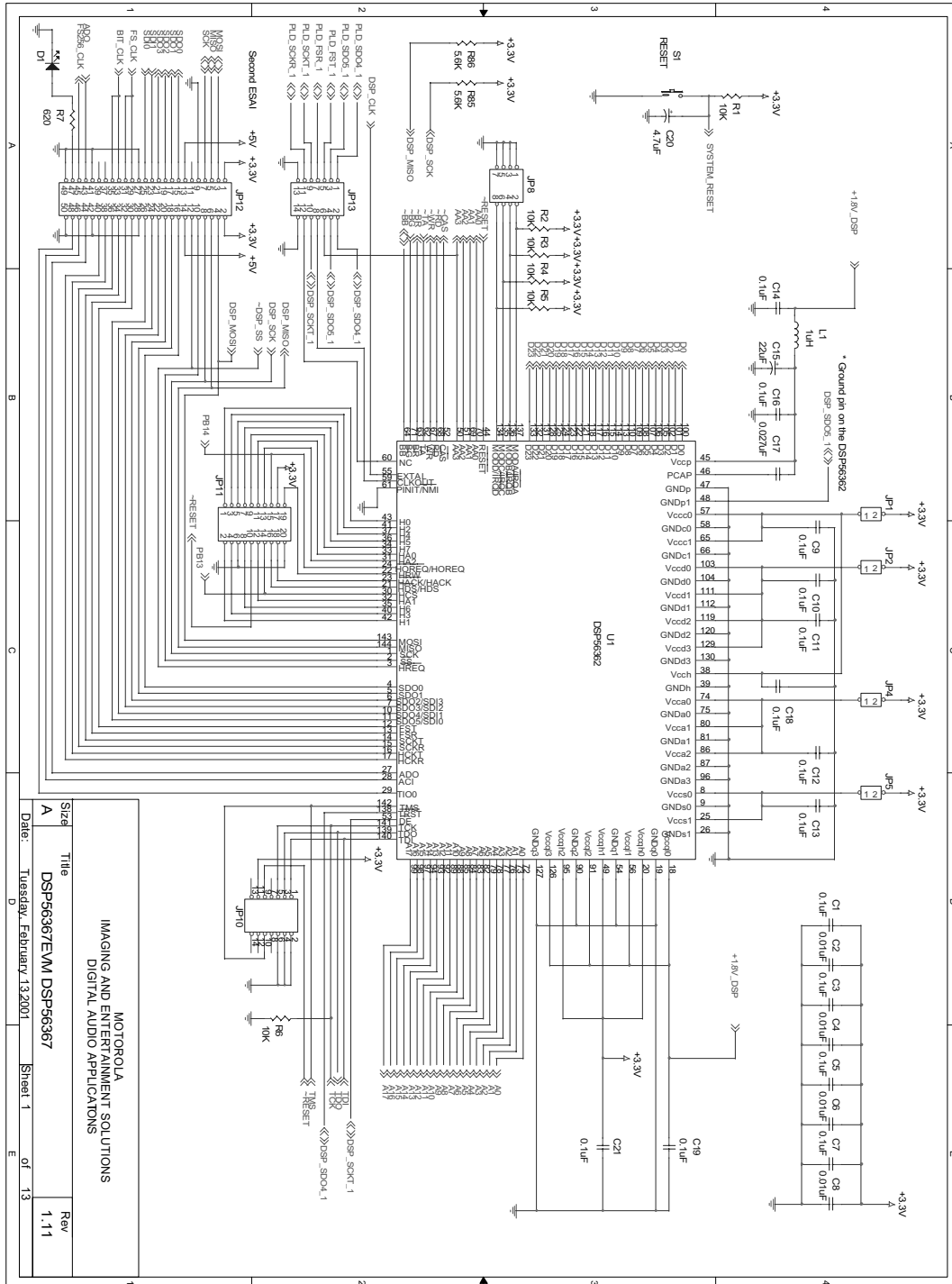
Table 3-1 Documentation Location

Motorola Devices	DESCRIPTION	Motorola Document Order Number
DSP56367	Product Brief	DSP56367P/D
	User Manual	DSP56367UM/D
	Family Manual	DSP56300FM/D
Other Devices	DESCRIPTION	LOCATION
PCM1800	Technical Datasheet	http://www-s.ti.com/sc/psheets/sbas071/sbas071.pdf
PCM1716	Technical Datasheet	http://www-s.ti.com/sc/psheets/sbas116/sbas116.pdf
CS8414	Technical Datasheet	http://www.cirrus.com/ftp/pubs/8413-4.pdf
CS8404	Technical Datasheet	http://www.cirrus.com/ftp/pubs/8403.pdf

SECTION 4

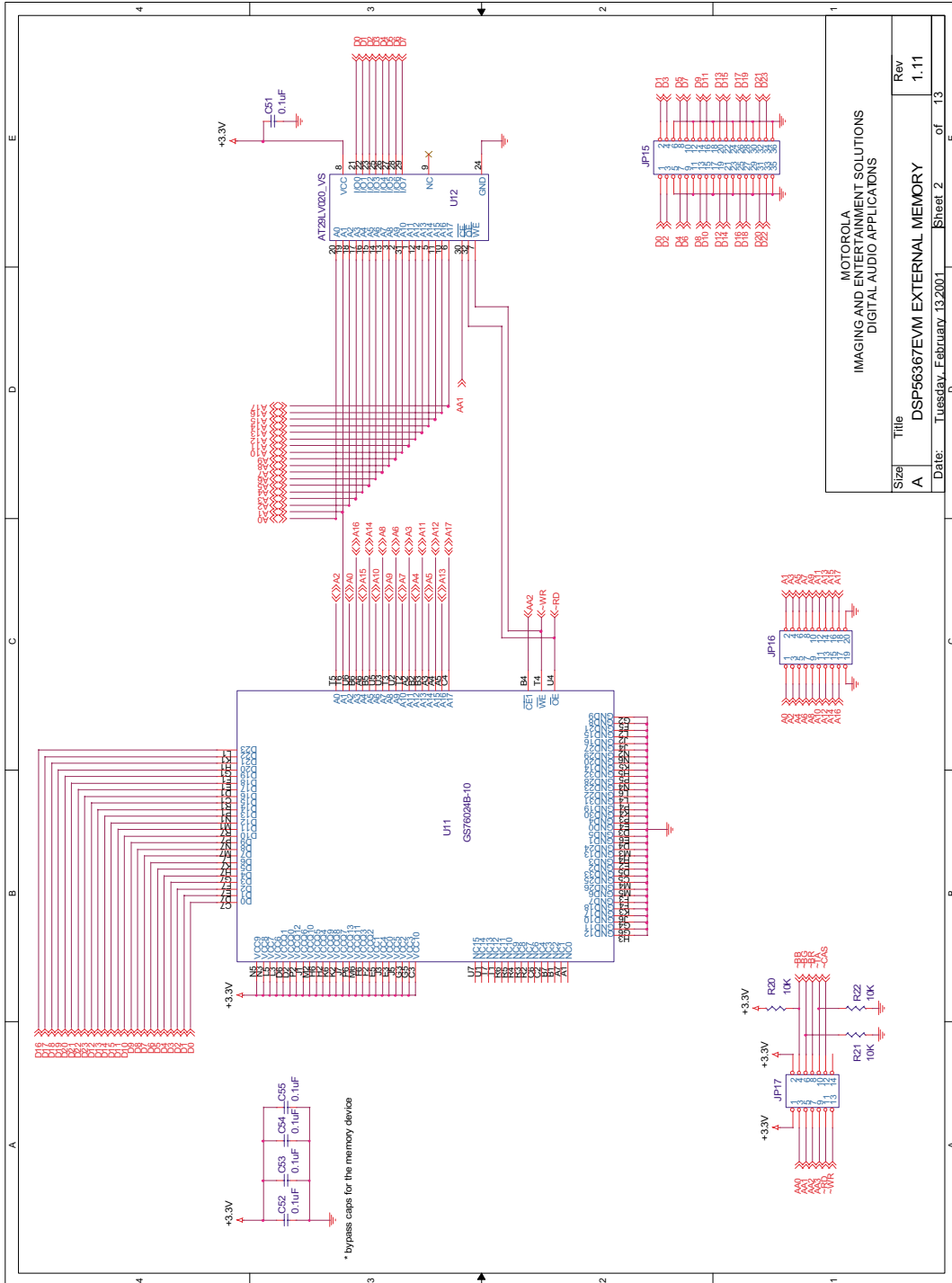
SCHEMATICS

The section contains the schematics for the DSP5636XEVm.

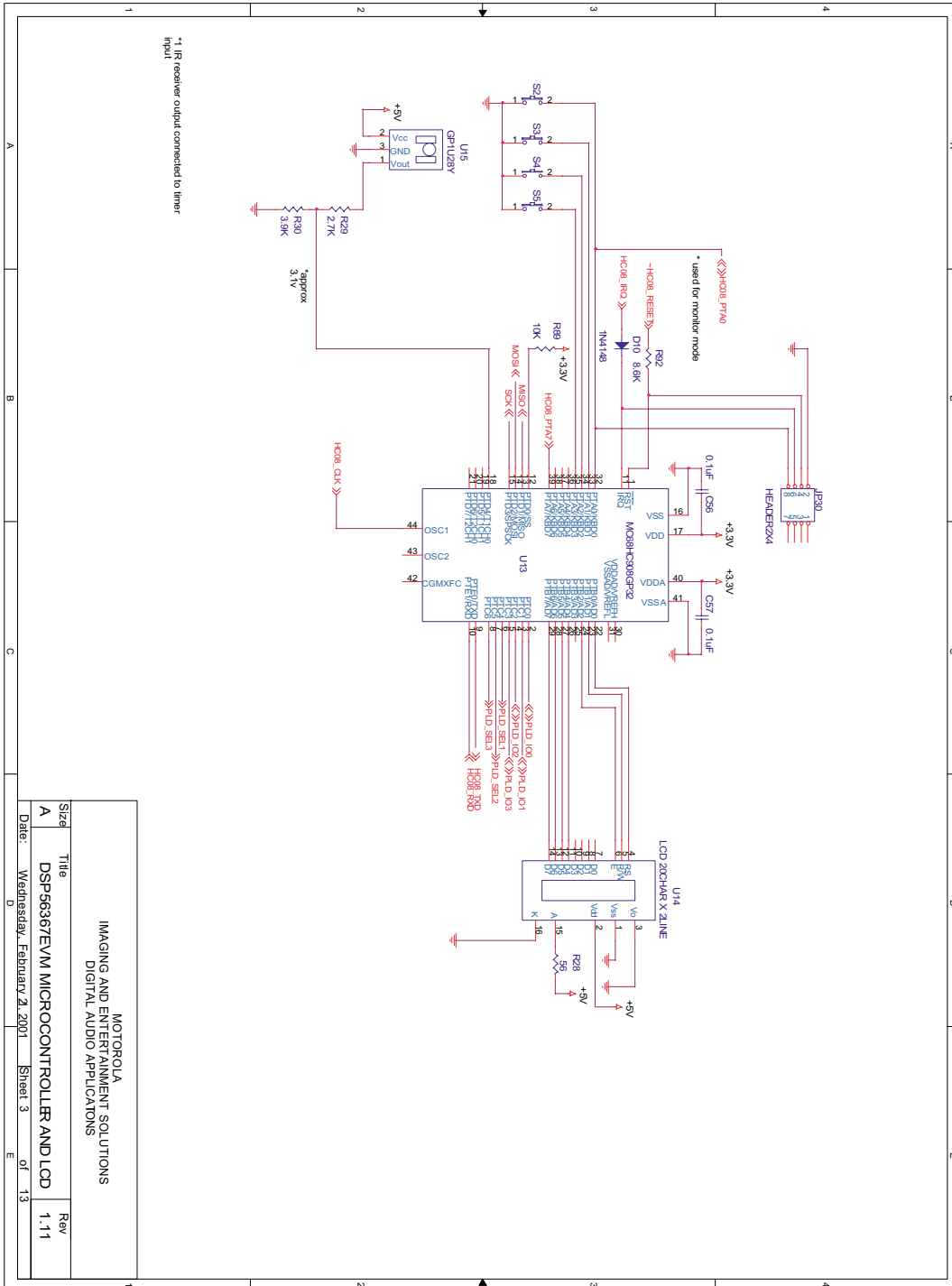


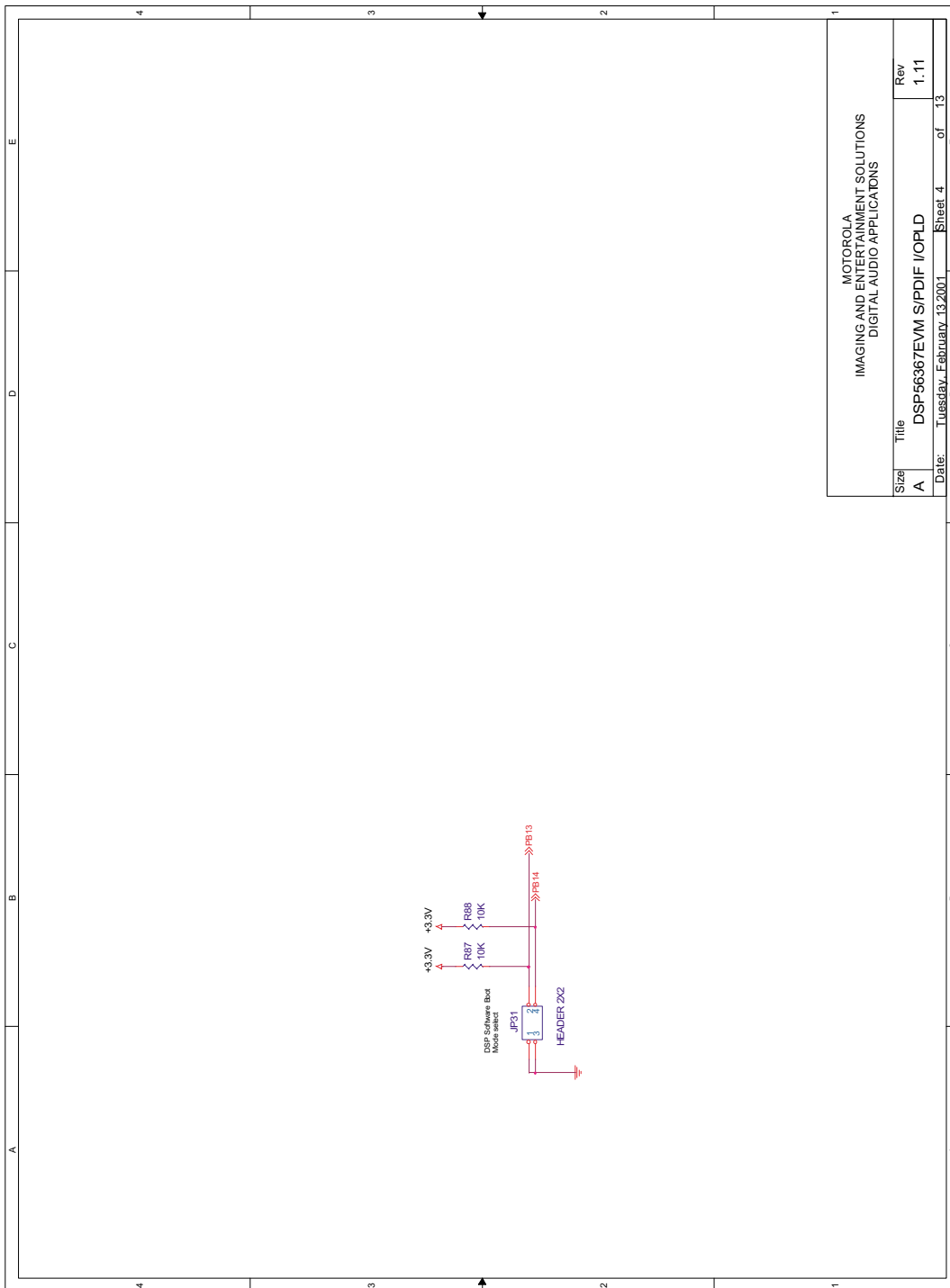
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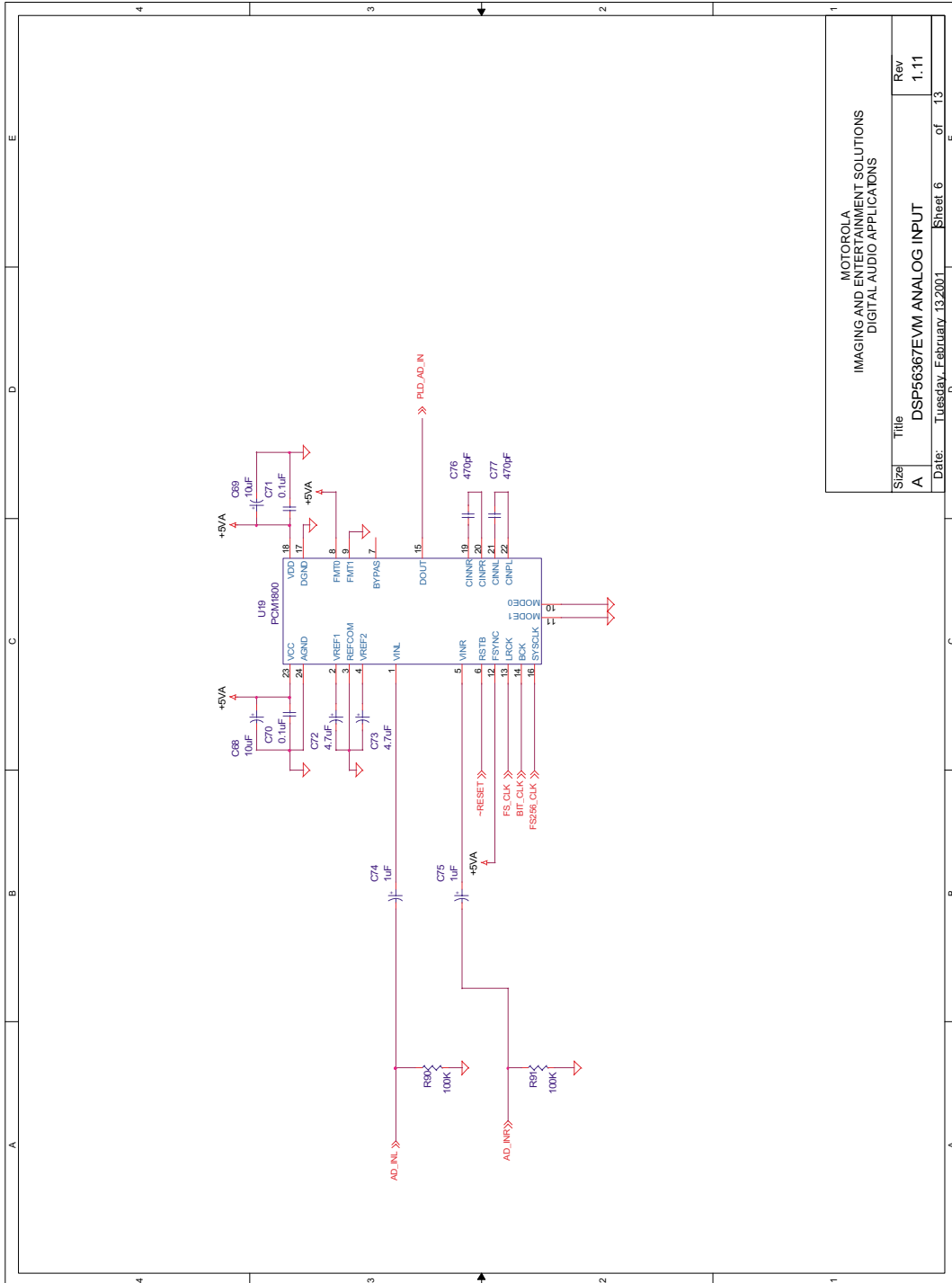


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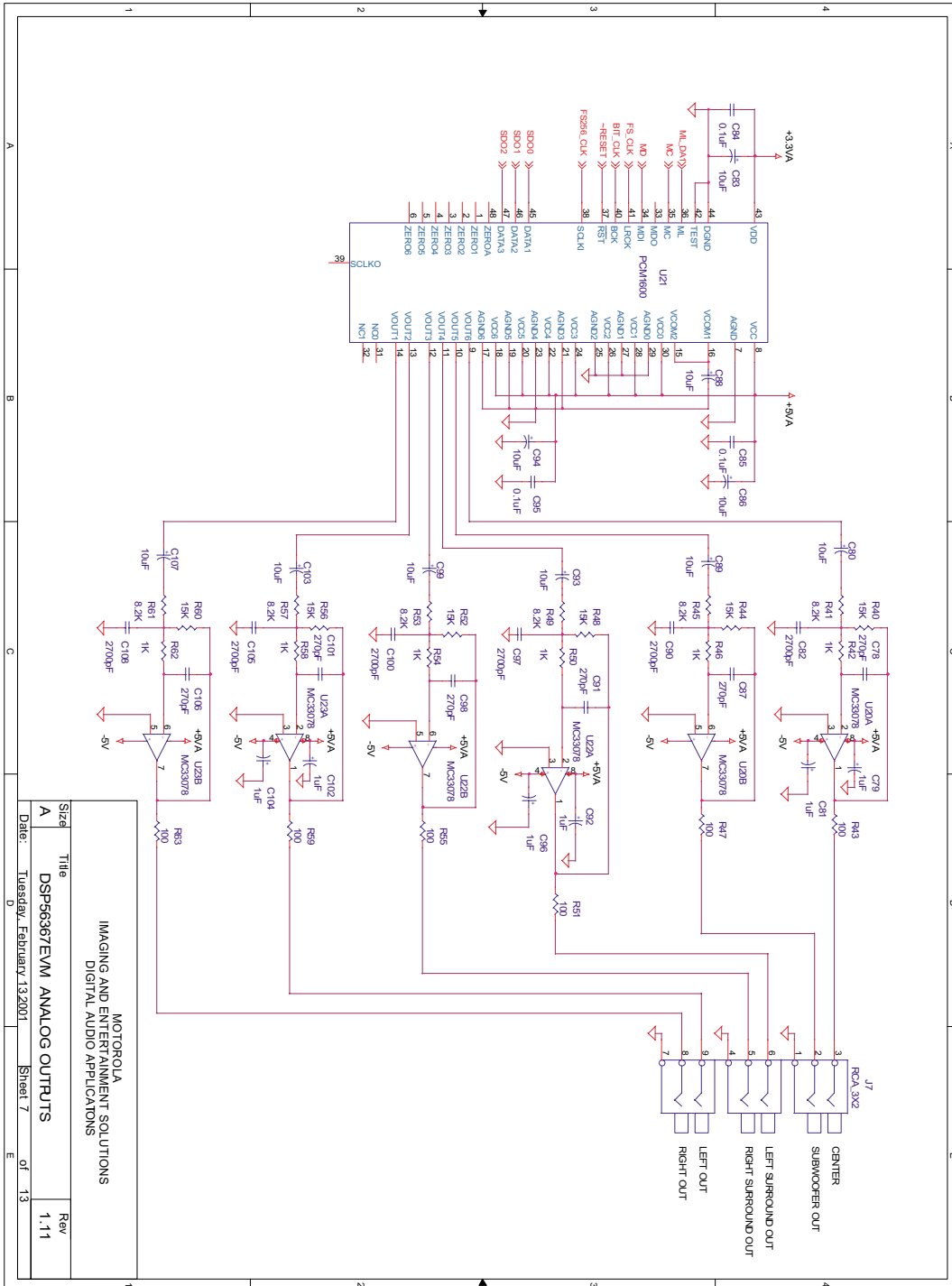




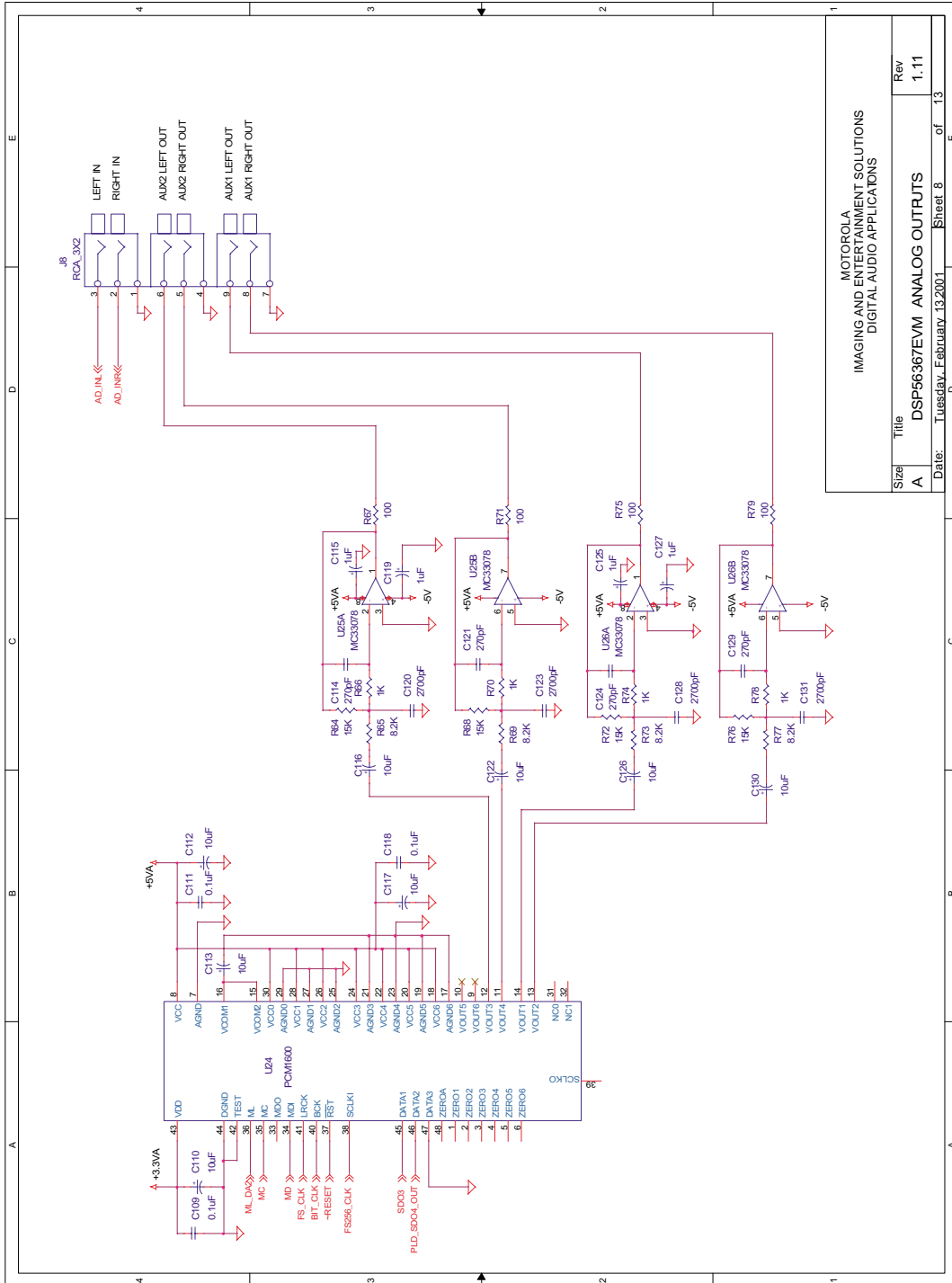
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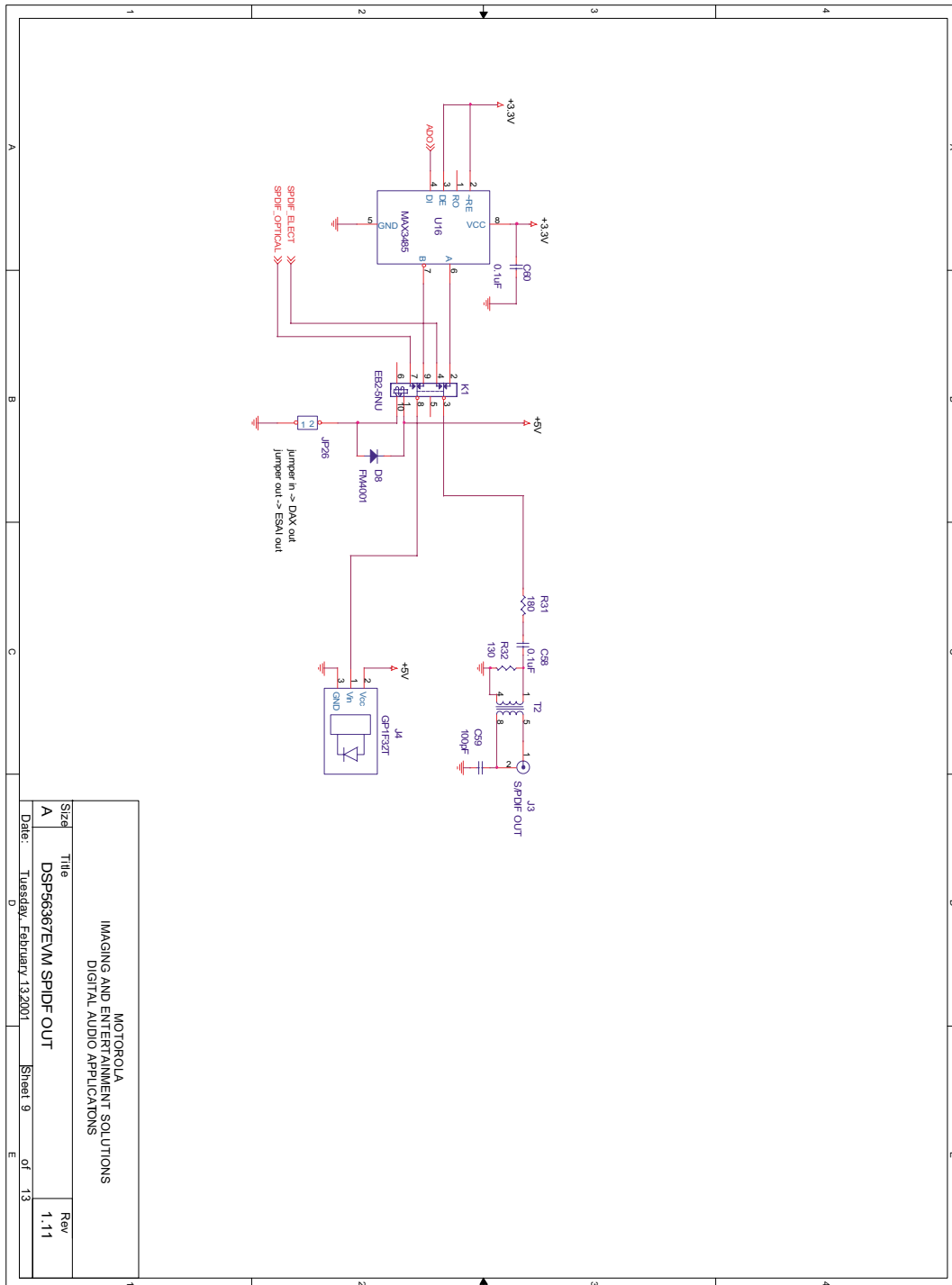
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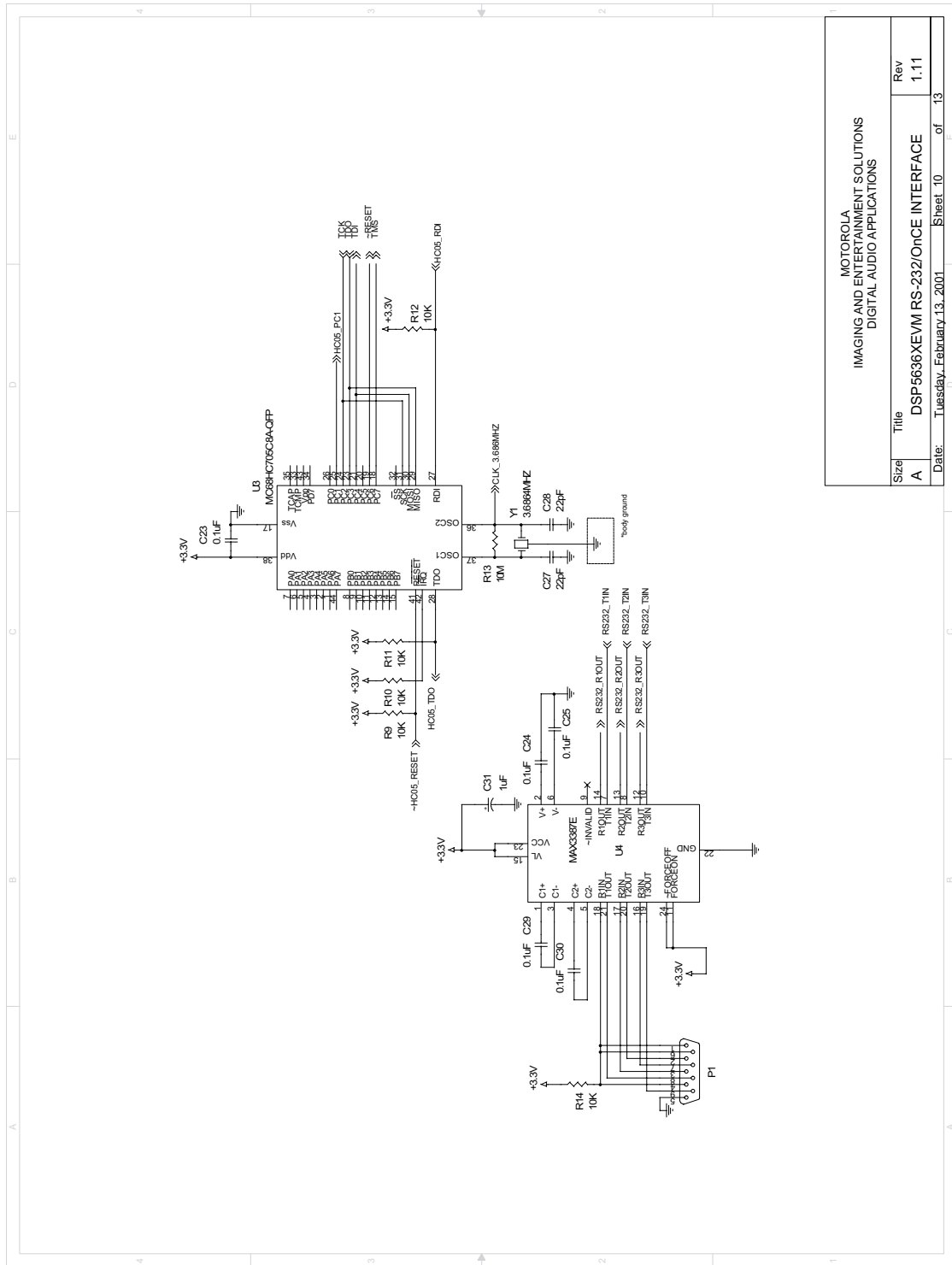
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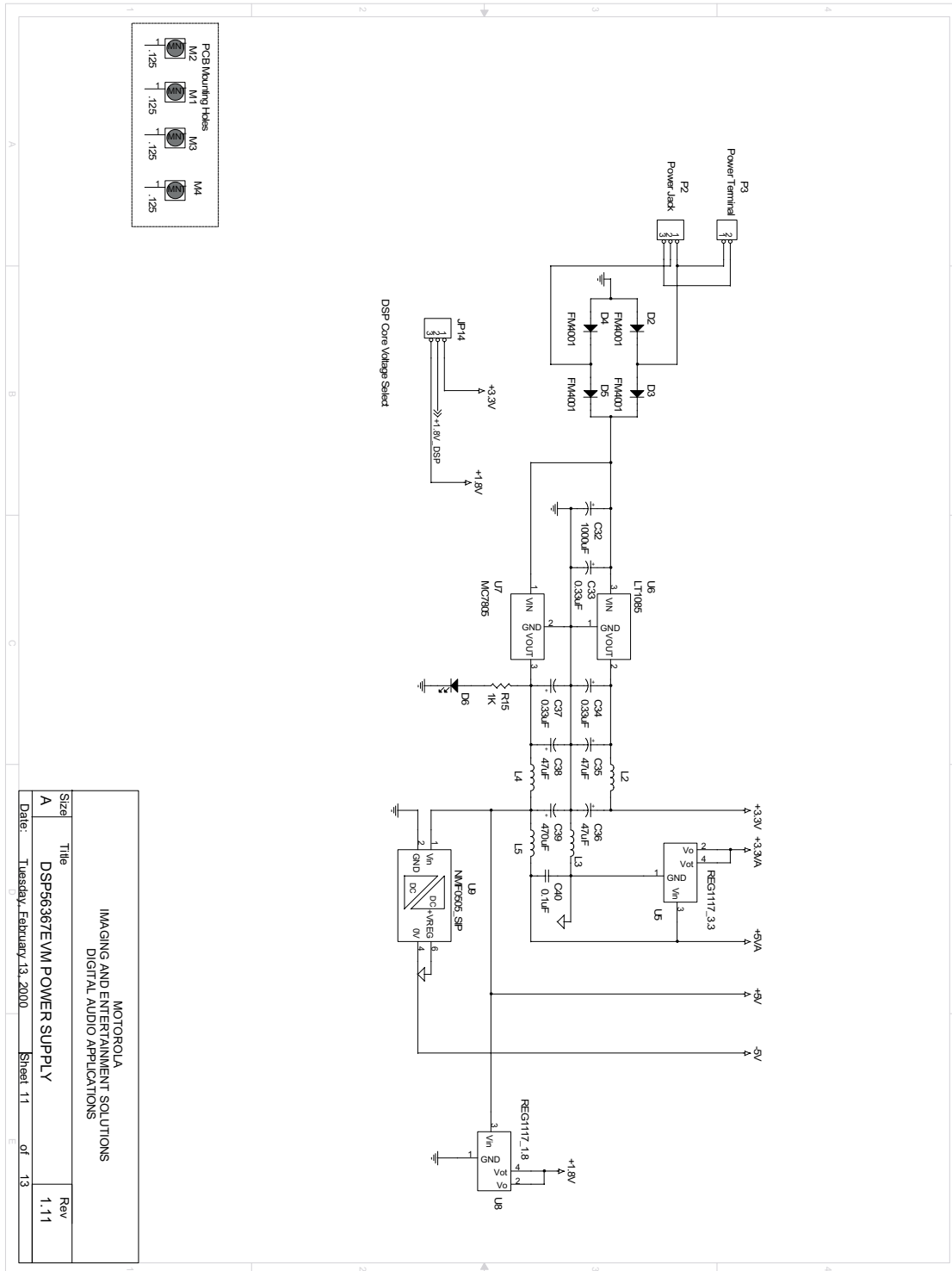
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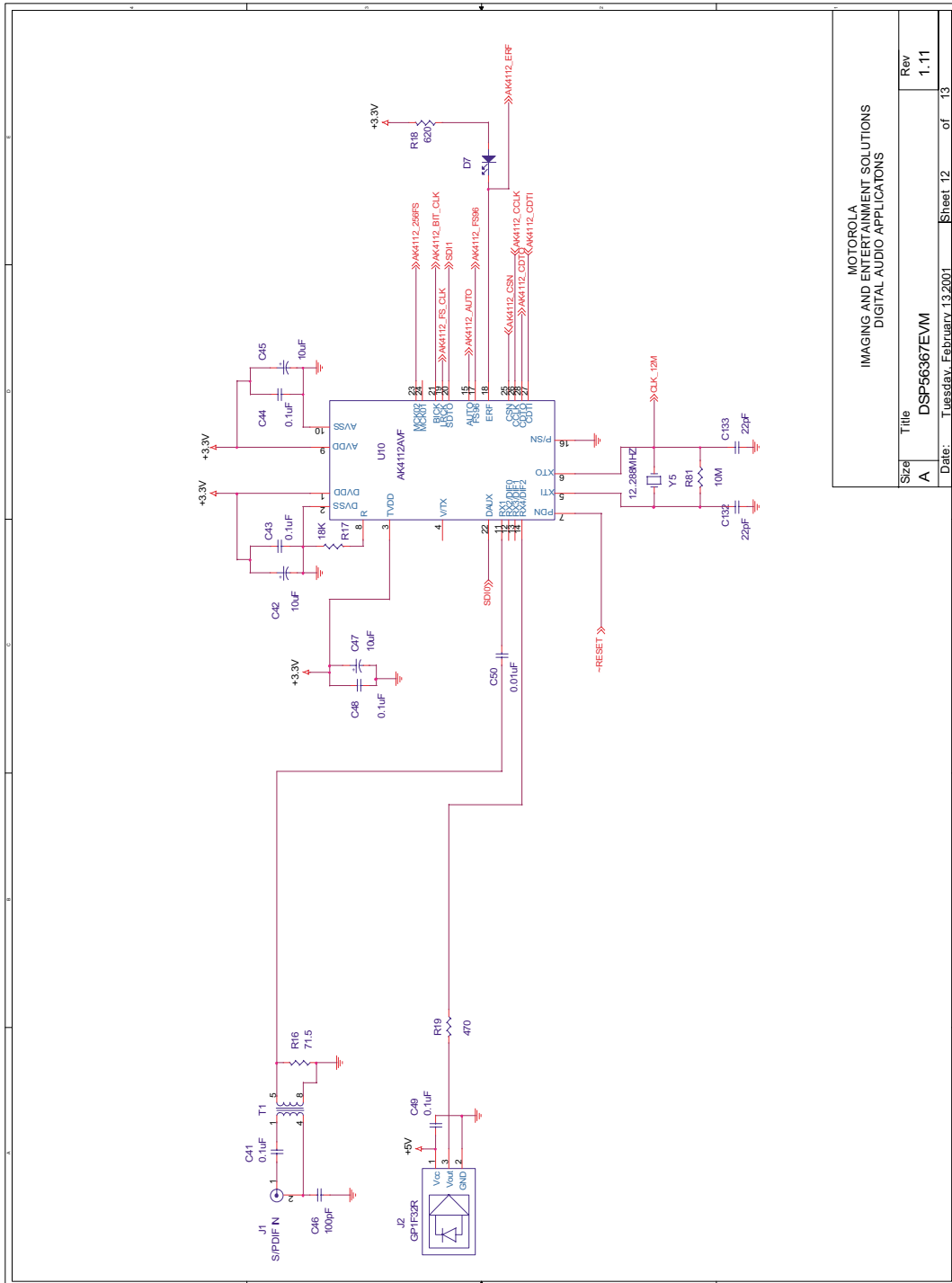


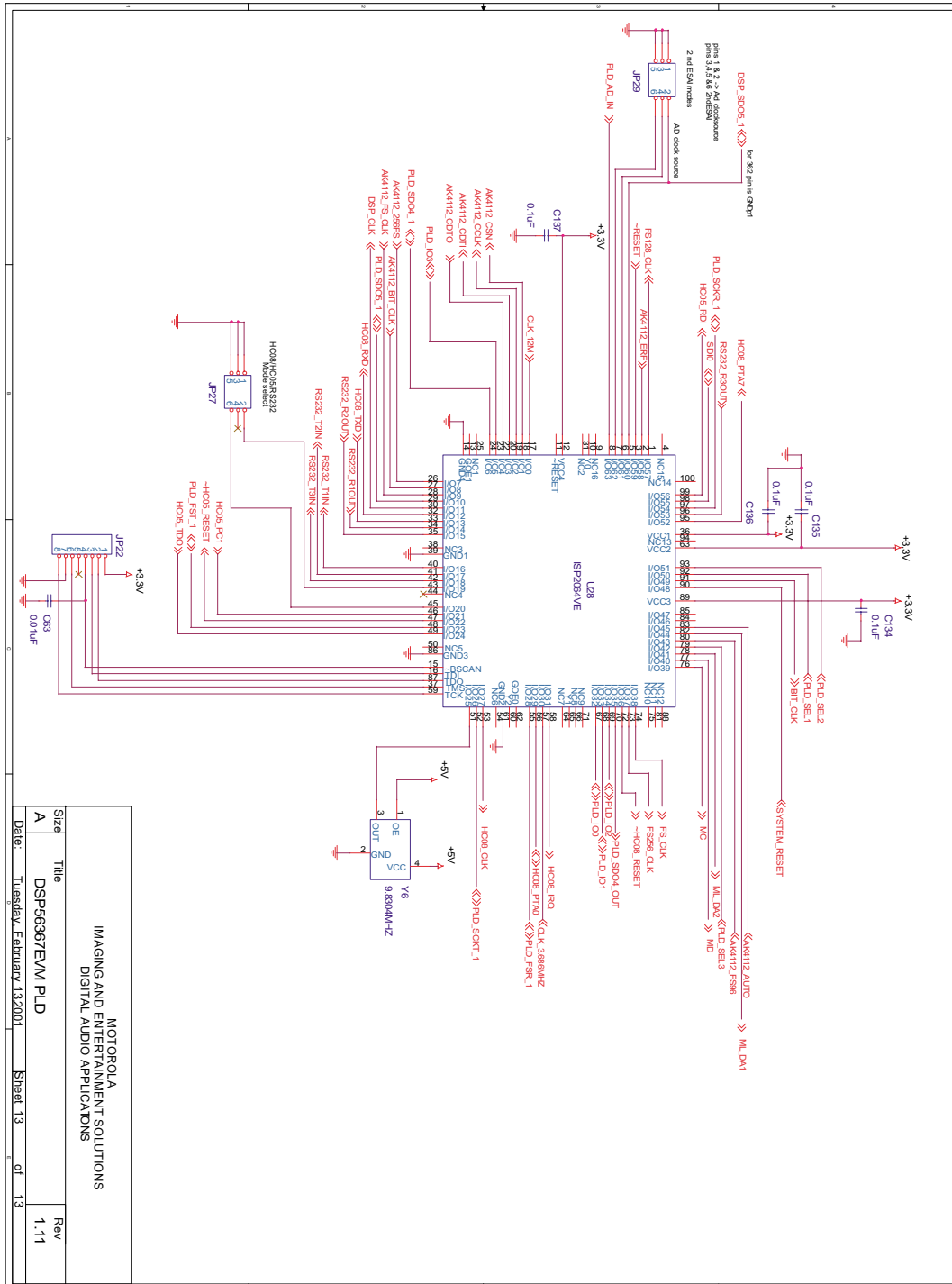
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SECTION 5

BILL OF MATERIALS

5.1 EVALUATION MODULE PARTS

The following table contains information on the parts and devices in the Evaluation Module.

Table 5-1 EVM Parts List

Reference Designator	Description	Manufacturer	Mfg. Part Number
C2,C4,C6,C8,C50,C63	0.01uF CHIPCAP 0805 X7R 50V/10% TOL	PANASONIC	ECU-V1H103KBG
C1,C3,C5,C7,C9,C10,C11, C12, C13, C14, C16, C18, C19, C21, C23, C24, C25, C29, C30, C40, C41, C43, C44, C48, C49, C51, C52, C53, C54, C55, C56, C57, C58, C60, C64, C70, C71, C84, C85, C95, C109, C111, C118, C134, C135, C136, C137	0.1uF CHIPCAP 0805 50V/20% TOL	AVX	08055E104MATMA
C15	22uF TANTALUM ELECTROLYTIC SMD 6.3V/EIA SIZE B/2K Reel	PANASONIC	ECS-T0JX226R
C17	0.027uF CHIPCAP 0805 X7R 50V/10% TOL	PANASONIC	ECU-V1H273K BX
C20,C72,C73	4.7uF TANTALUM ELECTROL. SMD 6.3V/EIA SIZE A/2K Reel	PANASONIC	ECS-T0JY475R
C59,C46	100pF CHIPCAP 0805 50V/5% TOL	PANASONIC	ECU-V1H101JCG
C42,C45,C47,C68,C69,C80, C83, C86, C88, C89, C93, C94, C99, C103, C107, C110, C112, C113, C116, C117, C122, C126, C130	10uF TANTALUM ELECTROL. SMD 6.3V/EIA SIZE A	PANASONIC	ECS-T0JY106R
C31,C74,C75,C79,C81, C92, C96, C102, C104, C115, C119, C125, C127	1uF TANTALUM ELECTROL SMD CHIPCAP 1206 16V/20% TOL	PANSONIC	ECS-T1CY105R
C76,C77	470pF CHIPCAP 0805 50V/5% TOL	PANASONIC	ECU-V1H471JCX
C27,C28,C132,C133	22pF CHIPCAP 1206 50V/5% TOL	PANASONIC	ECU-V1H220JCN

Table 5-1 EVM Parts List

Reference Designator	Description	Manufacturer	Mfg. Part Number
U3	8-BIT MICROCONTROLLER	MOTOROLA	MC68HC705C8ACFB
C82,C90,C97,C100,C105, C108, C120, C123, C128, C131	2700pF CHIPCAP 0805 NPO 50V/10% TOL	PANASONIC	ECU-V1H272KBN
C39	470uF RADIAL ALUMINUM ELECTROLYTIC 10V 8mmX11mm LS=3.5mm	XICON	XRL10V470
C32	1000uF MINI ALUM ELECTROL 16V/AXIAL/0.394X0.98 4	XICON	XAL16V1000
C33,C34,C37	0.33uF CHIPCAP TANTALUM 35V/20% TOL	PANASONIC	ECS-T1VY334R
C35,C36,C38	47uF SUBMINI ALUM ELECROL 10V/RADIAL/5X7	XICON	MLRL10V47
C78,C87,C91,C98,C101, C106, C114, C121, C124, C129	270pF CHIPCAP 0805 NPO 50V/10% TOL	AVX	08055A2711KAT1A
D1	YELLOW LED SMD 1206	QT OPTOELECTRON ICS	QTLP650D-3
D7	RED LED SMD 1206	QT OPTOELECTRON ICS	QTLP650C-2
D6	GREEN LED SMD 1206	QT OPTOELECTRON ICS	QTLP650C-4
D2,D3,D4,D5,D8	RECTIFIER 1.0 AMP SMD	RECTRON	FM4001
D10	DIODE 350 mW, 75v, SOD123	DIGI-KEY	1N4148W-7
JP1,JP2,JP4,JP5,JP26	SINGLE ROW 2 PIN HEADER 1x2	BERG	68001-402
JP14	SINGLE ROW 3 PIN HEADER 1x3	BERG	68001-403
JP8,JP25	DOUBLE ROW 8 PIN HEADER 2x4	BERG	67997-408
JP10,JP13,JP17	DOUBLE ROW 14 PIN HEADER 2x7	BERG	67997-414

Table 5-1 EVM Parts List

Reference Designator	Description	Manufacturer	Mfg. Part Number
JP11,JP16	DOUBLE ROW 20 PIN HEADER 2x10	BERG	67997-420
JP12	DOUBLE ROW 50 PIN HEADER 2x25	BERG	67997-450
JP15	DOUBLE ROW 36 PIN HEADER 2x18	BERG	67997-436
JP30	SINGLE ROW 10 PIN HEADER 1x10	BERG	68001-410
JP22	SINGLE ROW 8 PIN HEADER 1x8	BERG	68001-408
JP31	DOUBLE ROW 4 PIN HEADER 2x2	BERG	67997-404
JP27,JP29	DOUBLE ROW 6 PIN HEADER 2x3	BERG	67997-406
J1,J3	RCA JACK	VIMEX	SCJ-0358B
J4	OPTICAL TRANSMIT CONNECTOR	SHARP	GP1F32T
J2	OPTICAL RECEIVE CONNECTOR	SHARP	GP1F32R
J7,J8	RCA JACK 3X2	VIMEX	JA0600731G
K1	SMD RELAY	MOUSER	EB2-5NU
L1	1 μ H INDUCTOR SMD/2.5X3.2	TOKO	TKS1025CT
L2,L3,L4,L5	FERRITE BEAD	FUTURE	BL01RN1-A62
P1	DB9 CONNECTOR RT ANGLE/PCB MOUNT	MOUSER	152-3409
P2	2.1MM POWER CONNECTOR	SWITCHCRAFT	RAPC-722
P3	2 PIN TERMINAL BLOCK	AUGAT	2SV-02
R1,R2,R3,R4,R5,R6,R9, R10, R11, R12, R14, R20, R21, R22,R87,R88, R89	10K CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6GEYJ103V
R40,R44,R48,R52,R56,R60, R64,R68,R72,R76	15K CHIP RES 0805 1/10WATT 5%	ROHM	MCR10EZHI153
R29	2.7K CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6GEYJ272V

Table 5-1 EVM Parts List

Reference Designator	Description	Manufacturer	Mfg. Part Number
R7,R18	620 CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF6200V
R31	182 CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF1820V
R32	127 CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF1270V
R41,R45,R49,R53,R57,R61, R65,R69,R73,R77	8.2K CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6ENYJ822V
R16	71.5 CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF71R5V
R15,R42,R46,R50,R54,R58, R62,R66,R70,R74,R78	1K CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6GEYJ102V
R90, R91	100K CHIP RES 0805 1/10 WATT 5%	FUTURE	CR21-104JT
R17	18K CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6GEYJ183V
R19	464 CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF4640V
R30	3.92K CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF3921V
R43,R47,R51,R55,R59,R63, R67,R71,R75,R79	100 CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF101V
R13,R81	10M CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6GEYJ106V
R28	56 CHIP RES 0805 1/10WATT 5%	PANASONIC	ERJ-6GEYJ560V
R85, R86	5.62K CHIP RES 0805 1/10WATT 1%	PANASONIC	ERJ-6ENF5621V
R92	8.6K CHIP RES 1206 1/10WATT 1%	XICON	ME290-8 60K/REEL
S1,S2,S3,S4,S5	6MM PUSHBUUTON SWITCH	PANASONIC	EVQ-QS205K
T1,T2	96KHZ DIGITALTRANSFORM ER	SCIENTIFIC CONVERSION	SC979-03
U1	DSP 144PIN/TQFP *please see note #90	MOTOROLA	DSP5636X

Table 5-1 EVM Parts List

Reference Designator	Description	Manufacturer	Mfg. Part Number
U11	256KX24 SRAM 3.3V/BGA	GSI	GS76024B-10
U12	EPROM 3.3V/32 PIN TQFP	ATMEL	AT29LV020-20TI
U13	MICROCONTROLLER	MOTOROLA	MC68HC908GP32CFB
U14	LCD 20CHAR X 2LINE	POWERTIP	PC2002LRU-AEA-B
U15	GPU28Y	SHARP	GPU28Y
U4	MAX3387ECUG	MAXIM	MAX3387ECUG
U16	MAX3485ECSA	MAXIM	MAX3485ECSA
U28	PLD	LATTICE	ISP2064VE-100LT100
U18	DIGITAL AUDIO TRANSMITTER	CRYSTAL	CS8404A-CS
U19	20-BIT A/D CONVERTER 24-PIN/SSOP	BURR-BROWN	PCM1800E
U5	REG1117_3.3	BURR-BROWN	REG1117-3.3
U8	REG1117_1.8	BURR-BROWN	REG1117A-1.8
U21,U24	DELTA-SIGMA D/A CONVERTER	BURR-BROWN	PCM1600Y
U20,U22,U23,U25,U26	OP-AMP SO-8	Burr Brown	BBOPA2134UA
U10	DIGITAL AUDIO RECEIVER	AKM	AKM4112AVF
U6	3.3V REGULATOR TO-220	LINEAR TECH.	LT1085CT-3.3
U7	5V REGULATOR TO-220	MOTOROLA	MC7805ACT
U9	DC-DC CONVERTER	NEWPORT TECH.	NMF0505S
Y5	12.288MHZ CRYSTAL	MMD	B20AA1-12.288MHZ
Y6	9.8304MHZ OSCILLATOR SMD	CITIZEN	300-7018-1-ND
Y1	3.6864MHZ CRYSTAL	MMD	B20BA1-3.6864MHZ-3I
Mounting hardware for 'U14' and standoffs for the four corners of the PC board.	Standoffs	H.H. Smith	30F1463

Evaluation Module Parts

Table 5-1 EVM Parts List

Reference Designator	Description	Manufacturer	Mfg. Part Number
Mounting hardware for 'U14' and standoffs for the four corners of the PC board.	Screws	Waldom	FN-817-C
	PC Board	Westak	DSP56367EVM REV. 1.1
XU7	"Heatsink for U7 T0-220, L=0.75, W=0.520, H=0.500 (above dimensions are in inches)"	AAVID Thermal Technologies Inc.	HS107-ND
XU14	DOUBLE ROW 16-PIN MALE HEADER MOUNTS TO BOTTOM SIDE OF U14 LCD	BERG	78933-416H
XXU14	DOUBLE ROW 16-PIN FEMALE HEADER MOUNTS TO BOTTOM SIDE OF U14 LCD	BERG	68683-608
SHUNTS	"SHUNT CONN., 2 POSITION"	3M	929955-06
XU1 This part is mounted on a socket and the part information for the socket is given in the following columns	Yamaichi 144 pin TQFP socket IC149-144-145-S5	Yamaichi Electronics	IC149-144-145-S5
	DSP56367EVM Assembly	Xetel	
XXU7	4-40 -1/2	BOLT	
XXXU7	4-40	WASHER	
XXXXU7	4-40	NUT	
	Domain Debugger EVM563XX		
	User's Manual		
	P & E 10 pin PPI Cable		

SECTION 6

RUNNING THE PASS-THROUGH CODE

To demonstrate EVM operation, an example program, *digital.asm* is provided. Follow the procedures in previous sections to configure the hardware and the Domain Debugger software. All jumpers should be installed shown in Figure 2-2.

1. Connect a digital output from a source such as a DVD player at J1. Refer to figures 3 & 6 for location of the connector on the EVM.
2. Connect audio cables from the analog outputs, L and R at J7, to an audio amplifier. Refer to Figure 2-4 and Figure 2-5 for location of the connectors.
3. Apply power to the EVM and run the Domain Debugger software.
4. Load the *digital.cld* program from the file menu of the Domain Debugger.
5. Run the program. Refer to the documentation for the Domain Debugger for information on loading and running a program.

The example program is a pass through routine where the DSP receives and passes back the digital data unaltered through the ESAI interface. In summary, when the code is running, the digital S/PDIF signal is received by the AKM4112A(U10). This device extracts the digital clocks and the data from the S/PDIF signal and distributes it to the rest of the circuits. In particular, the data signal is sent to the SDI1 pin of the DSP. Then the DSP receives the digital data and transmits it back as unaltered data to the DSP's ESAI SDO0-SDO3 pins. These output signals are sent to the two Burr-Brown PCM1600 D/A converters (U21 and U24). The converted analog signals are sent through an analog filter to the outputs at J7 and J8. Refer to **Section 2 Analog I/O on page 2-6** and **Section 2 Digital I/O on page 2-8** for additional information.

If an analog input is selected as the signal source for the above example, users must perform the following:

Disconnect the digital signal at J1

Connect an analog audio signal at Lin and Rin at J8

The signal switching is automatic and the analog source is selected when the digital signal at J1 is disconnected. The digital data converted by the A/D is sent to the SDI1 pin of the DSP. The rest of the operation is identical to when a digital signal is used as previously described in this section.

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DSP5636XEVMMUM/AD

Revision 1.0

02/01