

AKD4101A-B

AK4101A Evaluation Board Rev.0

GENERAL DESCRIPTION

The AKD4101A-B is an evaluation board for the AK4101A, 192kHz DIT. The AKD4101A-B has the interface with AKM's A/D converter evaluation boards and AKM's DIR evaluation boards. Therefore, it is easy to evaluate the AK4101A. The AKD4101A-B also has the digital audio interface and can achieve the interface with digital audio systems via optical link, BNC unbalance or XLR balance connector.

■ **Ordering guide**

AKD4101A-B --- Evaluation board for AK4101A
 (A cable for connecting with printer port of IBM-AT compatible PC and a control software are packed with this. The control software does not operate on Windows NT.)

FUNCTION

- **Digital interface**
- **Compatible with 2 types of interface**
 - Direct interface with AKM's ADC, DIR evaluation boards by 10pin header
 - Optical/BNC/XLR output
- **Serial control data I/F**
 - 1 input/output port (10-pin port)

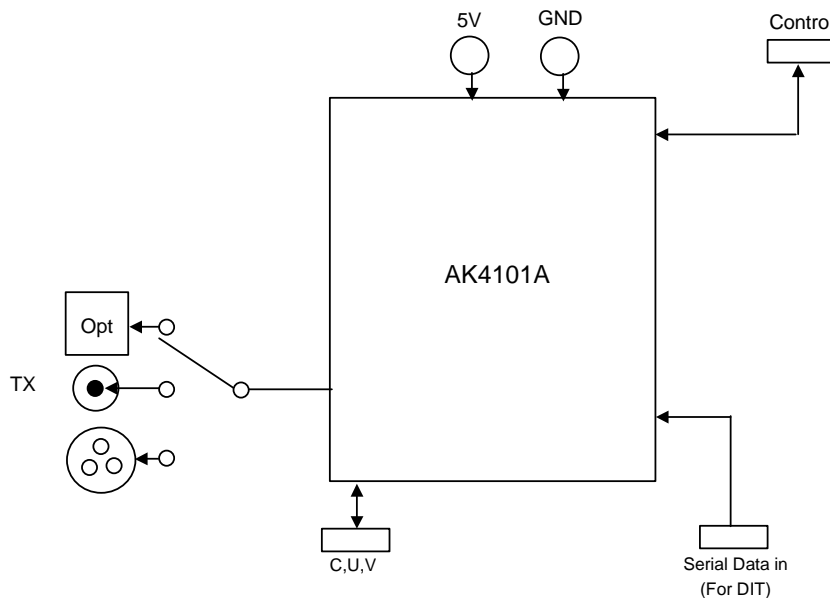


Figure 1. AKD4101A-B Block Diagram

*Circuit diagram and PCB layout are attached at the end of this manual.

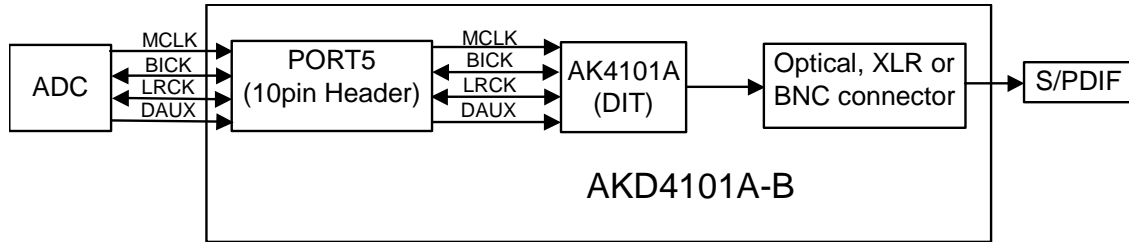
Evaluation Board Manual

■ **Operating sequence**

- (1) **Set up the power supply lines.**
 [+ 5V] (Red) = 5V
 [GND] (Black) = 0V
- (2) **Set up the evaluation mode and jumper pins.** (Refer to the following section.)
- (3) **Connect cables.** (Refer to the following section.)
- (4) **Power on.**
 The AK4101A should be reset once bringing PDN(SW2) “L” upon power-up.

■ **Evaluation modes**

- (1) Evaluation for DIT
 Serial Data in(10pin port) – AK4101A – S/PDIF out(optical, XLR or BNC)



MCLK, BICK, LRCK and DAUX are input via 10pin header (PORT5: DIT). The AKD4101A-B can be connected with the AKM’s ADC evaluation board via 10-line cable.

- a. Set-up of a Bi-phase output signal

Connector	JP19 (TXP)
Optical (PORT4)	OPT
XLR (J3)	XLR
BNC (J4)	BNC

Table 1. Set-up of TXP

- a-1. Set-up of TXP/TXN

TX	JP21 (TXP) Sub	JP22 (TXN) Sub
TXP1/TXN1	4-5 pin (short)	4-5 pin (short)
TXP2/TXN2	3-6 pin (short)	3-6 pin (short)
TXP3/TXN3	2-7 pin (short)	2-7 pin (short)
TXP4/TXN4	1-8 pin (short)	1-8 pin (short)

Table 2. Set-up of TXP/TXN

b. Set-up of clock input and output

The used signals are MCLK, LRCK, BICK and SDTI (DAUX).
The signal level outputted and inputted from PORT5 is 5V.

Clock	PORT
MCLK	PORT5
BICK	PORT5
LRCK	PORT5
SDTI (DAUX)	PORT5

Table 3. Clock input/output

CKS1 pin (SW3_5)	CKS0 pin (Sub_JP20)	MCLK	fs (max)	Default
CKS1 bit	CKS0 bit			
0	0	128fs	28k-192 kHz	
0	1	256fs	28k-108 kHz	
1	0	384fs	28k-54 kHz	
1	1	512fs	28k-54 kHz	

Table 4. Master Clock Frequency Select

b-1. Set-up of input/output of BICK and LRCK

Please set up SW 3_8 (DIT_I/O) according to the setup of audio format of AK4101A (Refer to Table 6).

Audio format	SW3_8 (DIT_I/O)	Default
Slave mode	0	
Master mode	1	

Table 5. Set-up of DIT_I/O

c. Set-up of audio data format

It sets up by SW 1_2, SW 1_3 and SW1_4 in synchronous mode. Please set up DIF2-0 bit in asynchronous mode.

Mode	DIF2 pin (SW1_4)	DIF1 pin (SW1_3)	DIF0 pin (SW1_2)	SDTI	LRCK		BICK		Default
	DIF2 bit	DIF1 bit	DIF0 bit			I/O		I/O	
0	0	0	0	16bit, Right justified	H/L	I	64fs	I	
1	0	0	1	18bit, Right justified	H/L	I	64fs	I	
2	0	1	0	20bit, Right justified	H/L	I	64fs	I	
3	0	1	1	24bit, Right justified	H/L	I	64fs	I	
4	1	0	0	24bit, Left justified	H/L	I	64fs	I	
5	1	0	1	24bit, I ² S	L/H	I	64fs	I	
6	1	1	0	24bit, Left justified	H/L	O	64-128fs	O	
7	1	1	1	24bit, I ² S	L/H	O	64-128fs	O	

Table 6. Audio format

■ **B, C, U, V Inputs (synchronous mode)**

At synchronous mode (ANS=1), C(channel status), U(user data) and V(validity) are input via 10pin header (PORT3: BCUV). BLS is output at normal mode (TRANS=0), and is input at audio routing mode (TRANS=1). In case of audio routing mode, BLS, C, U an V can be directly input from the AKD4114 via 10-line flat cable. The pin layout of PORT3 is shown in Figure 2.

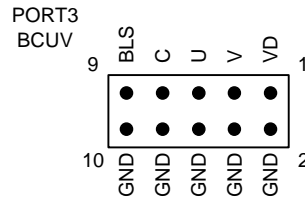


Figure 2. PORT3 pin layout

■ **Serial control**

The AK4101A can be controlled by pins at synchronous mode (ANS=1) and by internal register at asynchronous mode (ANS=0). Synchronous/Asynchronous mode is set as Table 7.

Mode	SW1-6 (ANS)	JP18 (SDA/CDTO)	Sub JP20 (ANS)
Synchronous	ON	FS3=1: Short “CDTO/CM0=H” side. FS3=0: Short “CM0=L” side.	Open.
Asynchronous	OFF	Short “CDTO/CM0=H” side.	Short.

Default

Table 7. Synchronous/Asynchronous mode

At asynchronous mode (ANS=0), the AK4101A can be controlled via printer port (parallel port) of IBM-AT compatible PC. Connect PORT6 (uP-I/F) with PC by 10-line flat cable packed with the AKD4101A-B. Take care of the direction of connector. There is a mark at pin#1. The pin layout of PORT6 is shown in Figure 3.

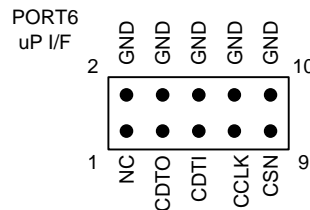


Figure 3. PORT6 pin layout

Control software is packed with the AKD4101A-B. The software manual is included in this eva-board manual.

■ Toggle switch set-up

SW2	PDN	Reset switch for AK4101A. Set to “H” during normal operation. Bring to “L” once after the power is supplied.
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■ DIP switch (SW1) set-up: -off- means “L”

No.	Switch Name	Function	Default
1	IPS0	Don't care	OFF
2	DIF0	Set-up of DIF0 pin. (synchronous mode)	OFF
3	DIF1	Set-up of DIF1 pin. (synchronous mode)	OFF
4	DIF2	Set-up of DIF2 pin. (synchronous mode)	ON
5	IPS1/IIC	Don't care	OFF
6	ANS	Set-up of ANS pin. “OFF”: asynchronous mode, “ON”: synchronous mode	OFF
7	TEST	Don't care	OFF
8	ACKS	Don't care	OFF

■ DIP switch (SW3) set-up: -off- means “L”

No.	Switch Name	Function	Default
1	FS1	Sampling frequency select at synchronous mode (ANS=1). (See the datasheet.)	OFF
2	FS2		OFF
3	FS0		OFF
4	PSEL	Don't care	OFF
5	CKS1	Set-up of CKS1 pin. (synchronous mode)	OFF
6	TRANS	Set-up of TRANS pin. “OFF”: normal mode, “ON”: audio routing mode	OFF
7	DIR_I/O	Don't care	OFF
8	DIT_I/O	Set-up of the transmission direction of 74AC245 “OFF”: When inputting from PORT5, “ON”: When outputting from PORT5	OFF

■ Jumper set up.

No.	Jumper Name	Function
1	D3V/VD	Set-up of Power supply source for 74AC245. D3V : D3V VD : VD (default)
18	SDA/CDTO	Set-up of FS3 pin Synchronous mode : short CDTO/CM0="H" → FS3 pin="H" short CM0="L" → FS3 pin="L" Asynchronous mode: short CDTO/CM0="H" (default)
19	TXP1	Set-up of TXP1 output circuit. OPT : Optical (default) XLR : XLR BNC : BNC
19(sub)	ANS	Set-up depending synchronous / asynchronous mode Open : synchronous mode Short : asynchronous mode (default)
20(sub)	CKS0	Set-up of CKS0 pin Open : CKS0 pin="H" Short : CKS0 pin="L" (default)
21(sub)	TXP	Set-up of TXP output 4-5 pin Short: TXP1 (default) 3-6 pin Short: TXP2 2-7 pin Short: TXP3 1-8 pin Short: TXP4
22(sub)	TXN	Set-up of TXN output 4-5 pin Short: TXN1 (default) 3-6 pin Short: TXN2 2-7 pin Short: TXN3 1-8 pin Short: TXN4

Control Software Manual

■ Set-up of evaluation board and control software

1. Set up the AKD4101A-B according to previous term.
2. Connect IBM-AT compatible PC with AKD4101A-B by 10-line type flat cable (packed with AKD4101A-B). Take care of the direction of 10pin header. (Please install the driver in the CD-ROM when this control software is used on Windows 2000/XP. Please refer "Installation Manual of Control Software Driver by AKM device control software". In case of Windows95/98/ME, this installation is not needed. This control software does not operate on Windows NT.)
3. Insert the CD-ROM labeled "AKD4101A-B Evaluation Kit" into the CD-ROM drive.
4. Access the CD-ROM drive and double-click the icon of "akd4101A.exe" to set up the control program.
5. Then please evaluate according to the follows.

■ Operation flow

Keep the following flow.

1. Set up the control program according to explanation above.
2. Click "Port Reset" button.

■ Explanation of each buttons

1. [Port Reset] : Set up the USB interface board (AKDUSBIF-A) .
2. [Write default] : Initialize the register of AK4101A.
3. [All Write] : Write all registers that is currently displayed.
4. [Function1] : Dialog to write data by keyboard operation.
5. [Function3] : The sequence of register setting can be set and executed.
6. [Function4] : The sequence that is created on [Function3] can be assigned to buttons and executed.
7. [Function5]: The register setting that is created by [SAVE] function on main window can be assigned to buttons and executed.
8. [SAVE] : Save the current register setting.
10. [OPEN] : Write the saved values to all register.
11. [Write] : Dialog to write data by mouse operation.

■ Indication of data

Input data is indicated on the register map. Red letter indicates "H" or "1" and blue one indicates "L" or "0". Blank is the part that is not defined in the datasheet.

■ Explanation of each dialog

1. [Write Dialog]: Dialog to write data by mouse operation

There are dialogs corresponding to each register.

Click the [Write] button corresponding to each register to set up the dialog. If you check the check box, data becomes "H" or "1". If not, "L" or "0".

If you want to write the input data to AK4101A, click [OK] button. If not, click [Cancel] button.

2. [Function1 Dialog] : Dialog to write data by keyboard operation

Address Box: Input registers address in 2 figures of hexadecimal.

Data Box: Input registers data in 2 figures of hexadecimal.

If you want to write the input data to AK4101A, click [OK] button. If not, click [Cancel] button.

3. [Save] and [Open]

3-1. [Save]

Save the current register setting data. The extension of file name is "akr".

(Operation flow)

(1) Click [Save] Button.

(2) Set the file name and push [Save] Button. The extension of file name is "akr".

3-2. [Open]

The register setting data saved by [Save] is written to AK4101A. The file type is the same as [Save].

(Operation flow)

(1) Click [Open] Button.

(2) Select the file (*.akr) and Click [Open] Button.

4. [Function3 Dialog]

The sequence of register setting can be set and executed.

(1) Click [F3] Button.

(2) Set the control sequence.

Set the address, Data and Interval time. Set “-1” to the address of the step where the sequence should be paused.

(3) Click [Start] button. Then this sequence is executed.

The sequence is paused at the step of Interval="-1". Click [START] button, the sequence restarts from the paused step.

This sequence can be saved and opened by [Save] and [Open] button on the Function3 window. The extension of file name is “aks”.

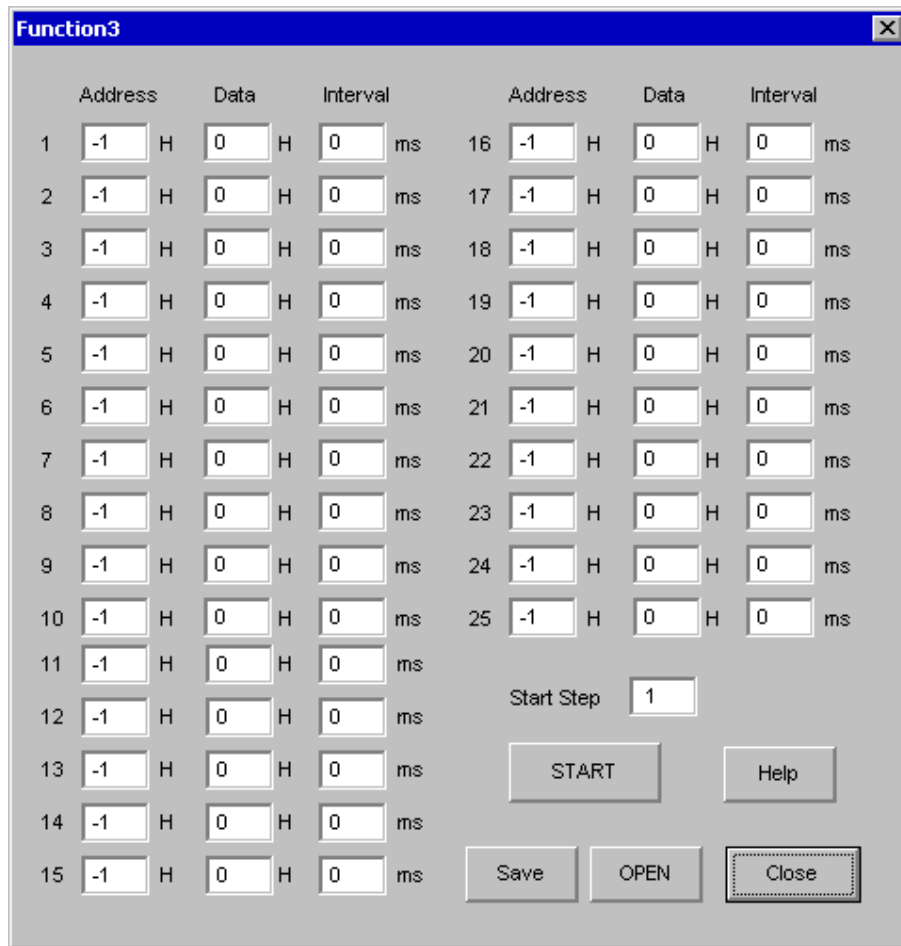


Figure 4. Window of [F3]

5. [Function4 Dialog]

The sequence that is created on [Function3] can be assigned to buttons and executed. When [F4] button is clicked, the window as shown in Figure 5 opens.

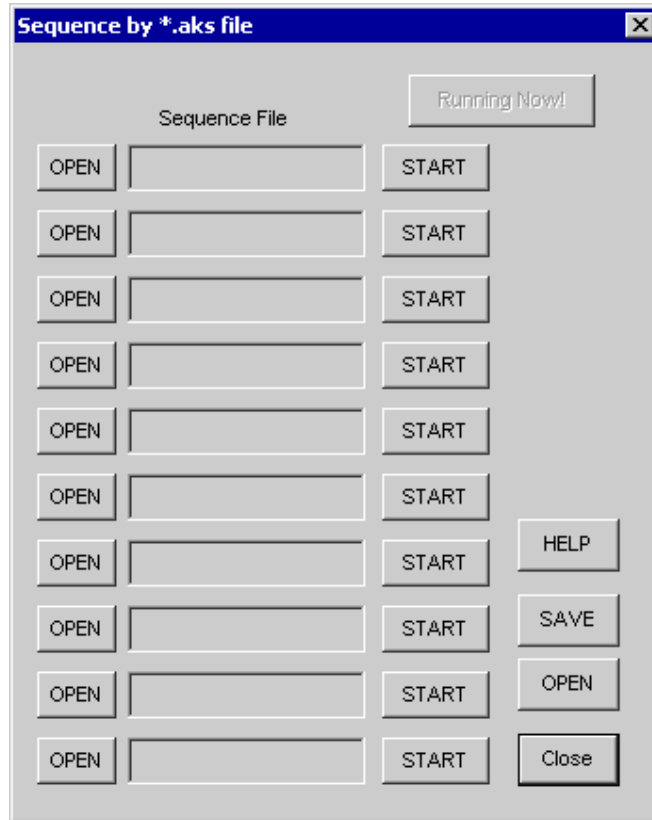


Figure 5. [F4] window

5-1. [OPEN] buttons on left side and [START] buttons

(1) Click [OPEN] button and select the sequence file (*.aks).

The sequence file name is displayed as shown in Figure 6.

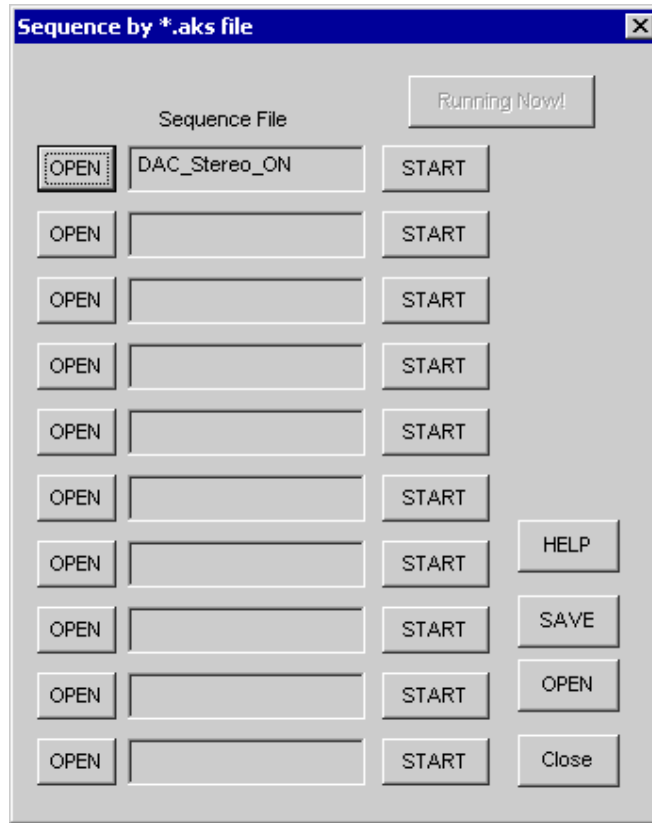


Figure 6. [F4] window(2)

(2) Click [START] button, then the sequence is executed.

5-2. [SAVE] and [OPEN] buttons on right side

[SAVE] : The sequence file names can assign be saved. The file name is *.ak4.

[OPEN] : The sequence file names assign that are saved in *.ak4 are loaded.

5-3. Note

(1) This function doesn't support the pause function of sequence function.

(2) All files need to be in same folder used by [SAVE] and [OPEN] function on right side.

(3) When the sequence is changed in [Function3], the file should be loaded again in order to reflect the change.

6. [Function5 Dialog]

The register setting that is created by [SAVE] function on main window can be assigned to buttons and executed. When [F5] button is clicked, the following window as shown in Figure 7 opens.

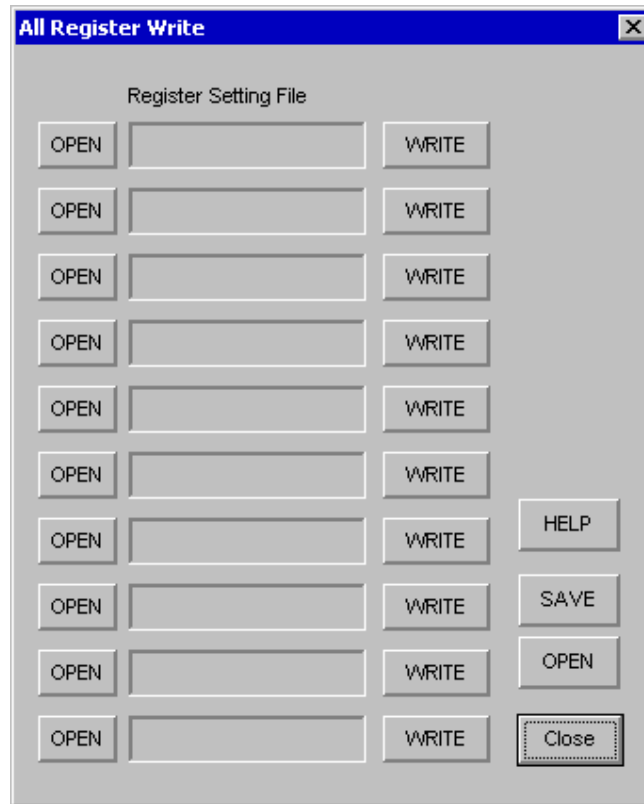


Figure 7. [F5] window

6-1. [OPEN] buttons on left side and [WRITE] button

- (1) Click [OPEN] button and select the register setting file (*.akr).
- (2) Click [WRITE] button, then the register setting is executed.

6-2. [SAVE] and [OPEN] buttons on right side

[SAVE] : The register setting file names assign can be saved. The file name is *.ak5.

[OPEN] : The register setting file names assign that are saved in *.ak5 are loaded.

6-3. Note

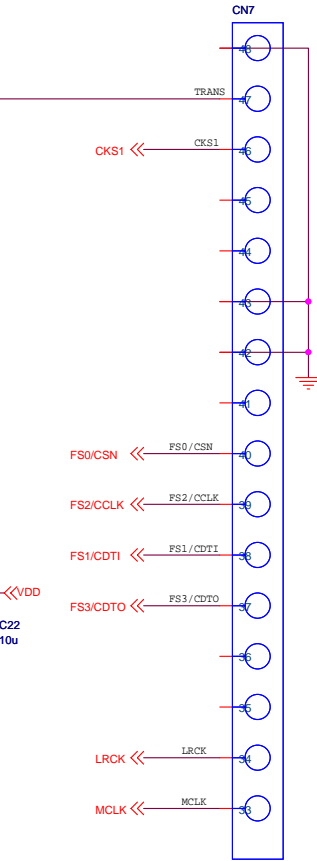
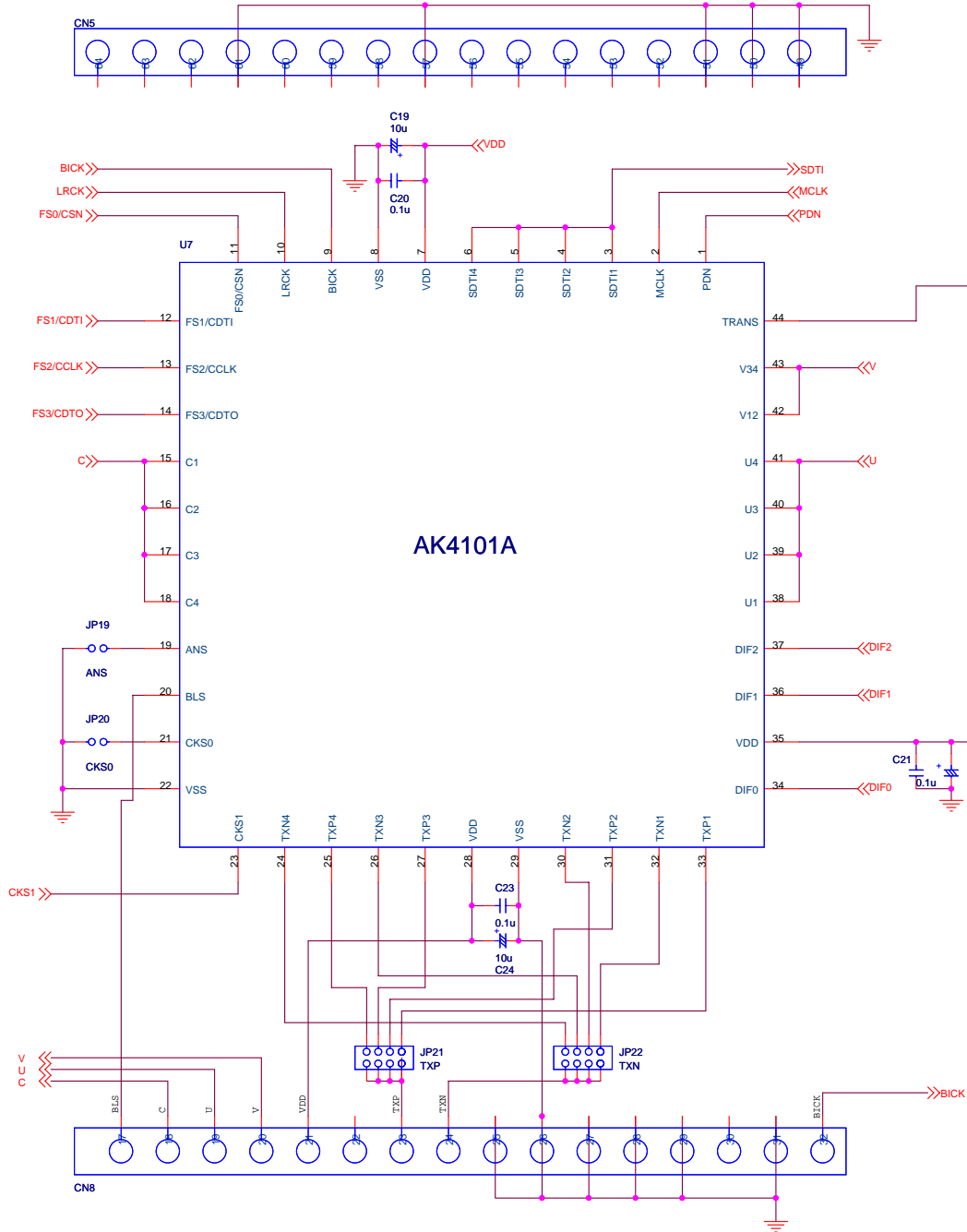
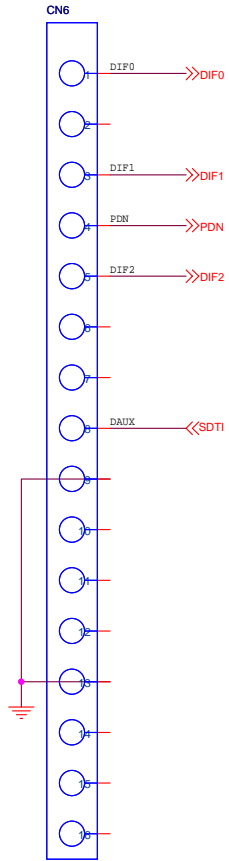
- (1) All files need to be in same folder used by [SAVE] and [OPEN] function on right side.
- (2) When the register setting is changed by [Save] Button in main window, the file should be loaded again in order to reflect the change.

Revision History

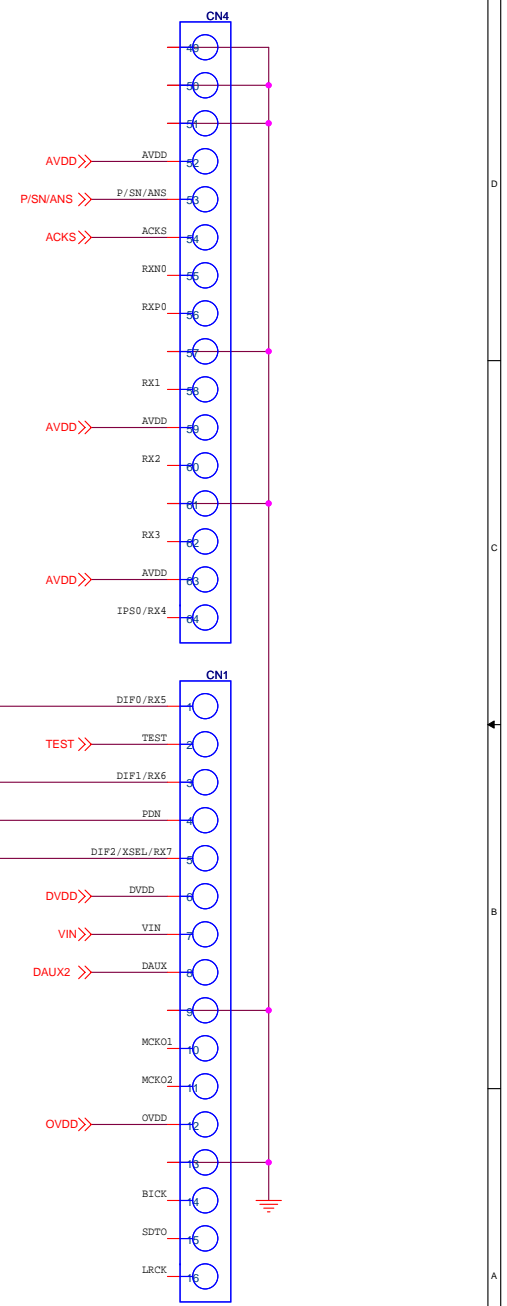
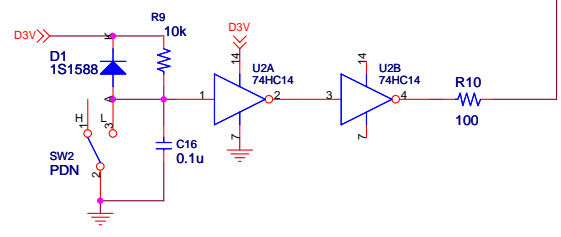
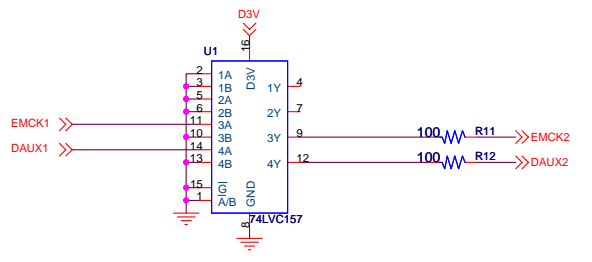
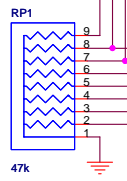
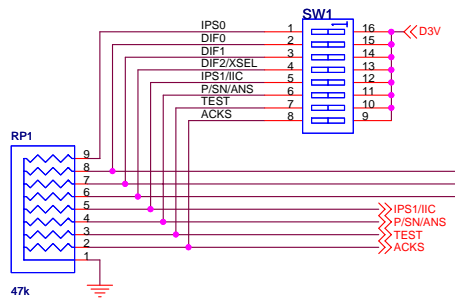
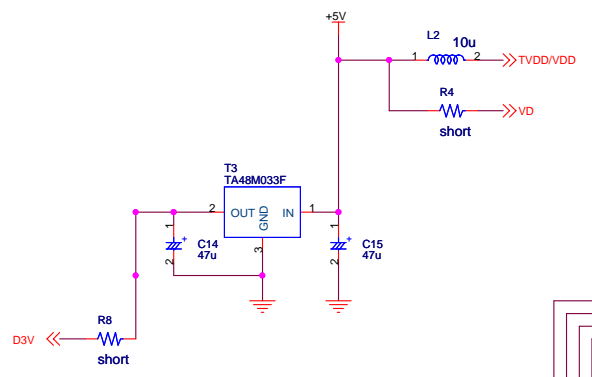
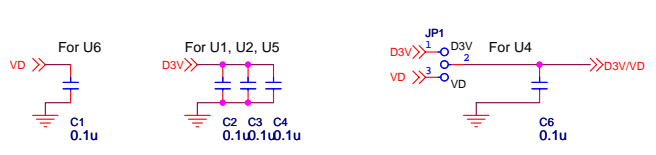
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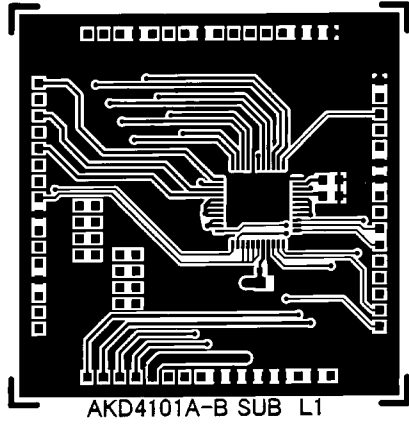
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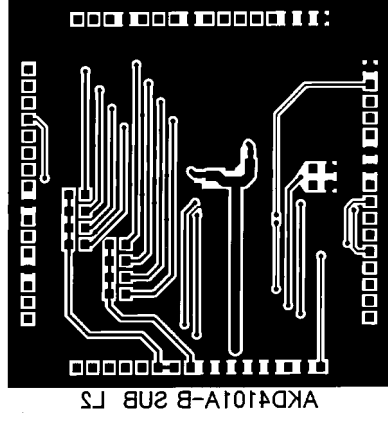


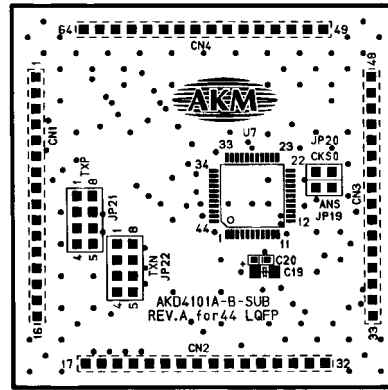
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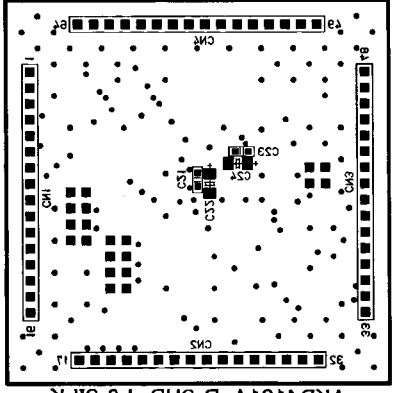
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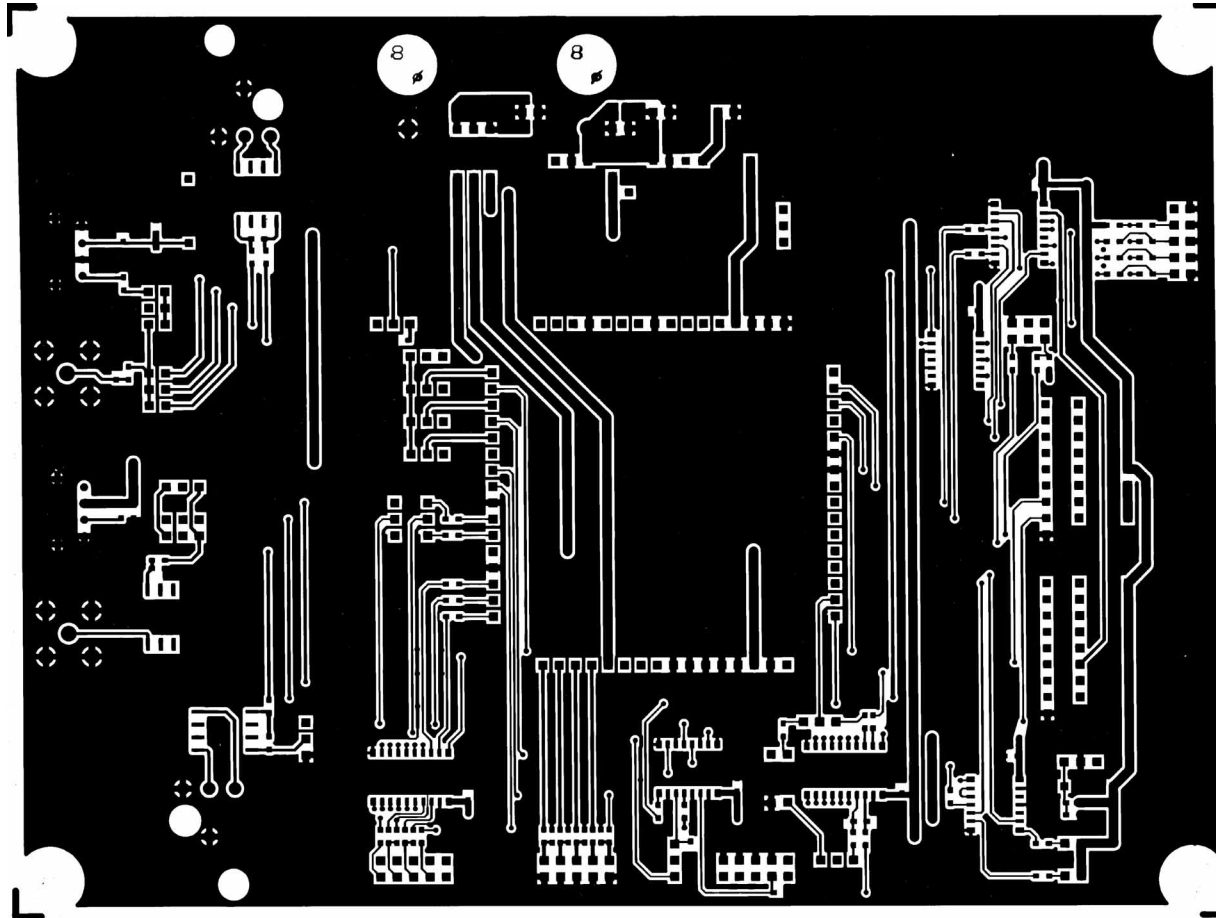




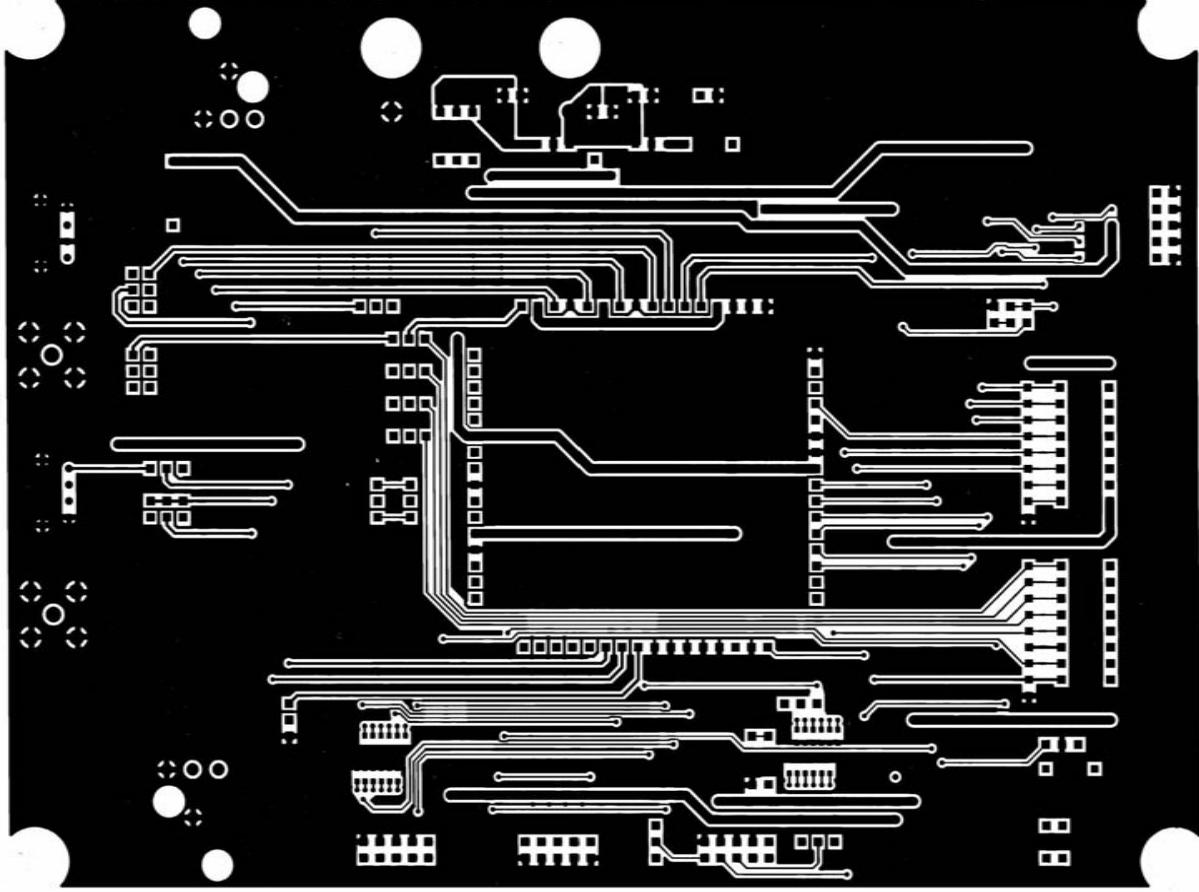
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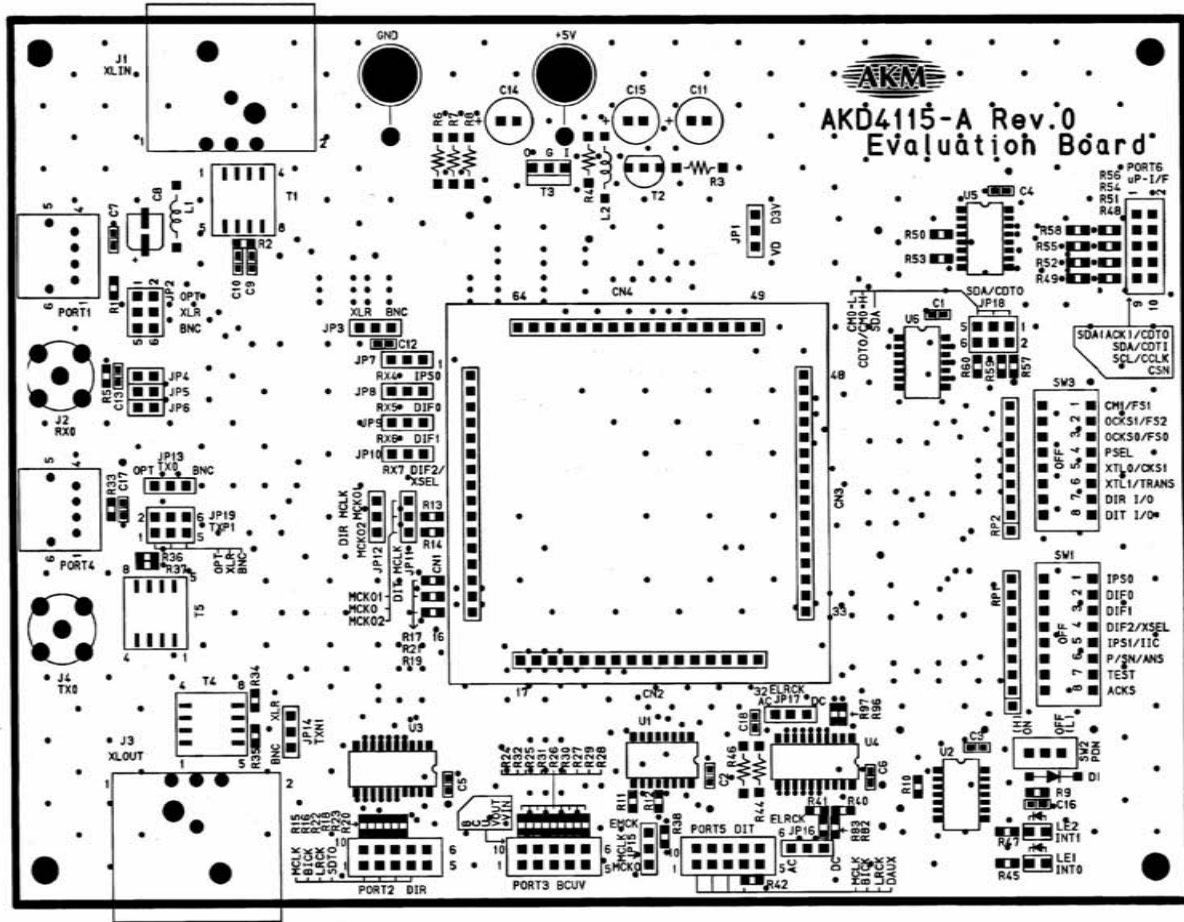
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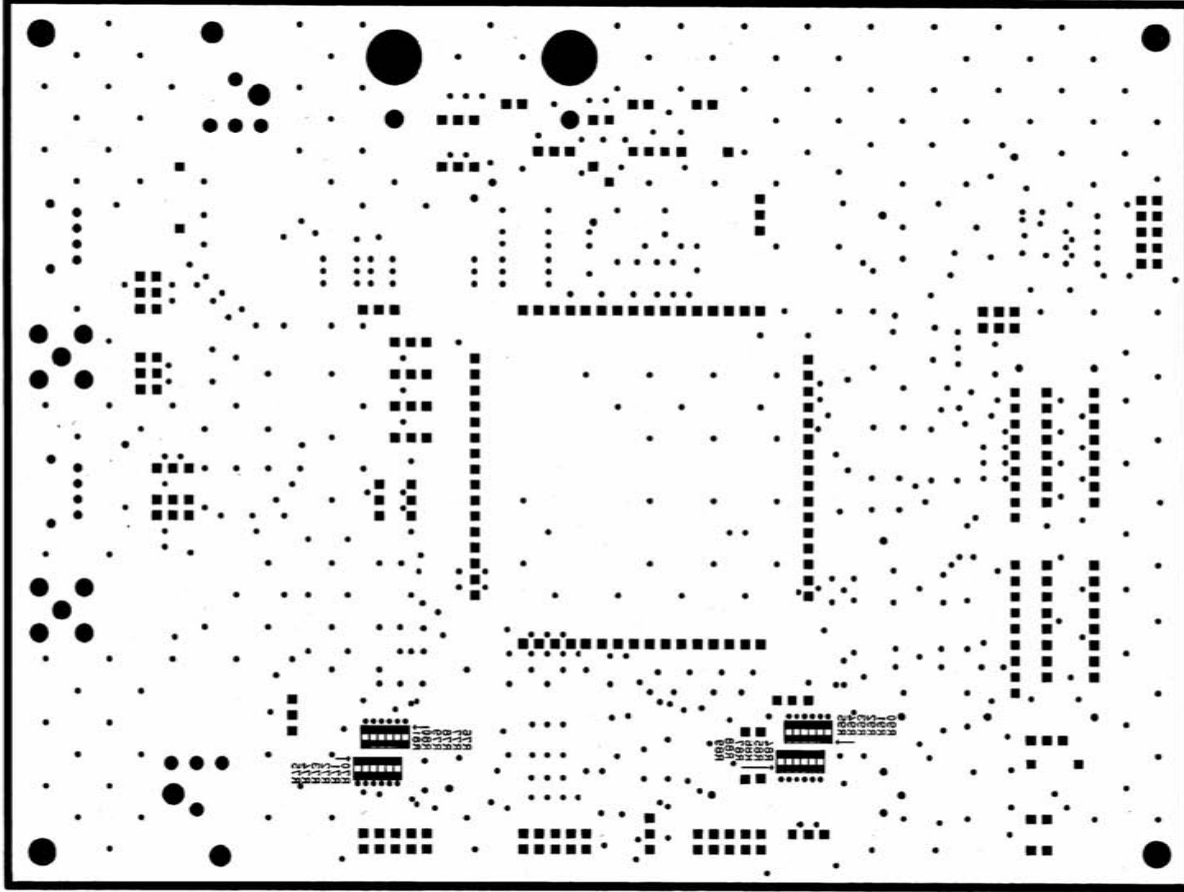
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AKD4115-A L1_SILK



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