

**MC141622EVK**

## **ACF-II Evaluation Board Operating Manual**

### **1. SUMMARY**

The MC141622EVK is a development board for evaluation of the MC141622. In addition to the MC141622, the MC141622EVK contains all the analog circuit that is necessary for buffering both the input and output video signal and generation of the 4xfsc clock. By connecting an external signal source, monitor, and power supply, it is possible to evaluate all the operating modes on the MC141622.

### **2. SPECIFICATION**

Board Dimensions	100 mm (Length) x 150 mm (Width)
Y/C Separation LSI	MC141622FU Mount
Video Input Amplifier	MC14577 2SC2002 Use
Video Output Amplifier	MC14576 Use
Clamp Circuit	2SC2002 2SA953 Use
Clock Generator	MC1378P Use
Clock Buffer Amplifier	MC14576 Use
Analog Input/Output Interface	BNC Connector x3, S Terminal Output Mount
Digital Input/Output Interface	16 Pin Header Mount
Action Mode	MC141622 Supports All Operating Modes
Regulator	MC7805CT Use
Recommended Supply Voltage	+ 10 V
Operating Temperature	0 to 50°C
Supply Current	350 mA

### 3. BOARD OPERATION

#### 3.1 ACF–II Operating Mode

ACF–II has four operating modes. Any one of these modes can be selected using the digital code input to MODE 0 and MODE 1 using ROTARY SW. The function of each mode is as follows.

##### (1) Normal fsc Mode

This is the mode for usual Y/C separation. It separates Y/C from the video signal that is input to the A/D converter.

The coring parameter of the vertical enhancer can be set up by the digital code that is input to C0 – C3 (block level parameter), C4 – C7 (white level parameter), and D4 – D7 (noise slice level parameter).

The clock is a 3.579545 MHz subcarrier input to the CLK connector; the built-in 4x PLL generates 4xfsc clock.

##### (2) Normal 4xfsc Mode

This mode is used for Y/C separation. It separates Y/C from the video signal that is input to the A/D converter.

The coring parameter of the vertical enhancer can be set up by the digital code that is input to C0 – C3 (block level parameter), C4 – C7 (white level parameter), and D4 – D7 (noise slice level parameter).

The clock is 14.31818 MHz which is a 4x subcarrier input to the CLK connector.

##### (3) Digital Input Comb Filter Mode

This mode uses the A/D converter, filter, and D/A converter as two independent blocks. The digital data converted by the A/D converter is output on C0 – C7. Data input on D0 – D7 is processed by the ACF–II. Filtering is performed by the algorithm of ACF–II and the Y/C video is output as analog signals from Y<sub>Out</sub> and C<sub>Out</sub>. These two blocks can operate with input clock signals that have different frequencies or phases and can be operated independently by using the CLK(AD) for the A/D converter, and the CLK input for the D/A converter.

The clock is 14.31818 MHz which is a 4x subcarrier input to the CLK connector and the CLK(AD) connector.

##### (4) Digital Output Comb Filter Mode

In addition to the normal Y/C analog outputs, the MC141622EVK can provide the Y/C signals as digital luminance and chrominance signals. The digital luminance data is output on C0 – C7 and the digital chrominance data is output on D0 – D7. This digital data can be modified by other digital processing.

The following table is the assignment for the operating mode.

### MODE Switching Function

Mode	MODE1	MODE0	Rotary SW
Normal fsc Mode	L	L	0
Normal 4xfsc Mode	L	H	1
Digital Input Comb Filtering Mode	H	L	2
Digital Output Comb Filtering Mode	H	H	3

#### 4. BK FUNCTION

By setting the BK pin (toggle SW1) to the H level, composite video is output on the  $Y_{out}$  pin and the chrominance signal on the  $C_{out}$  pin.

The following table is the function of the BK pin.

#### BK Function

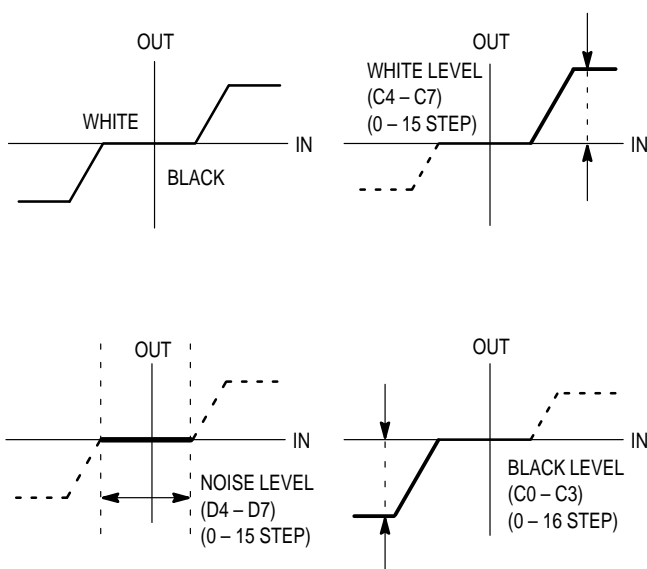
BK Pin	$Y_{out}$ Pin	$C_{out}$ Pin
L	Luminance	Chrominance
H	Composite	Chrominance

#### 4.1 Vertical Enhancer Function

By setting the VH pin (toggle SW2) to the L level, the vertical enhancer feature is enabled. The coring parameter of the vertical enhancer can be set up every 1 LSB by the digital code that are input to C0 – C3 (black level parameter), C4 – C7 (white level parameter), and D4 – D7 (noise slice level parameter).

The set up level of the coring parameter and characteristics are as follows.

#### Coring Characteristics



#### Vertical Enhancer Function

VH Pin	Vertical Enhancer
L	On
H	Off

#### Coring Parameter Set Up

C7	C6	C5	C4	Level
C3	C2	C1	C0	
D7	D6	D5	D4	
L	L	L	L	0
L	L	L	H	1
L	L	H	L	2
L	L	H	H	3
L	H	L	L	4
L	H	L	H	5
L	H	H	L	6
L	H	H	H	7
H	L	L	L	8
H	L	L	H	9
H	L	H	L	A
H	L	H	H	B
H	H	L	L	C
H	H	L	H	D
H	H	H	L	E
H	H	H	H	F

## 4.2 Clock Generator Compounding

The clock generator (MC1378P) provides the necessary reference oscillator and phase locks the clock to the color subcarrier by inputting the composite video signal.

VC1 adjusts the horizontal VCO to synchronize the output of the burst gate (pin 5 on the MC1378P) with the input video signal. VC2 adjusts the chroma VCO for maximum amplitude output from the clock buffer (pin 1 on the MC14576).

VR3 adjusts pull-in of the chroma PLL filter. This is usually fixed to the center position. VR4 selects the dc bias for the clock buffer output and is usually 2.25 V.

## 4.3 Video Amplifier Adjustment

On the video amplifier (MC14577), the gain is adjusted by VR1. This sets the input range (3.0 V<sub>p-p</sub>) of the A/D converter in MC141622FU.

VR2 is the clamp level adjustment. This adjusts the sync tip clamping of the input video signal to the video amplifier.

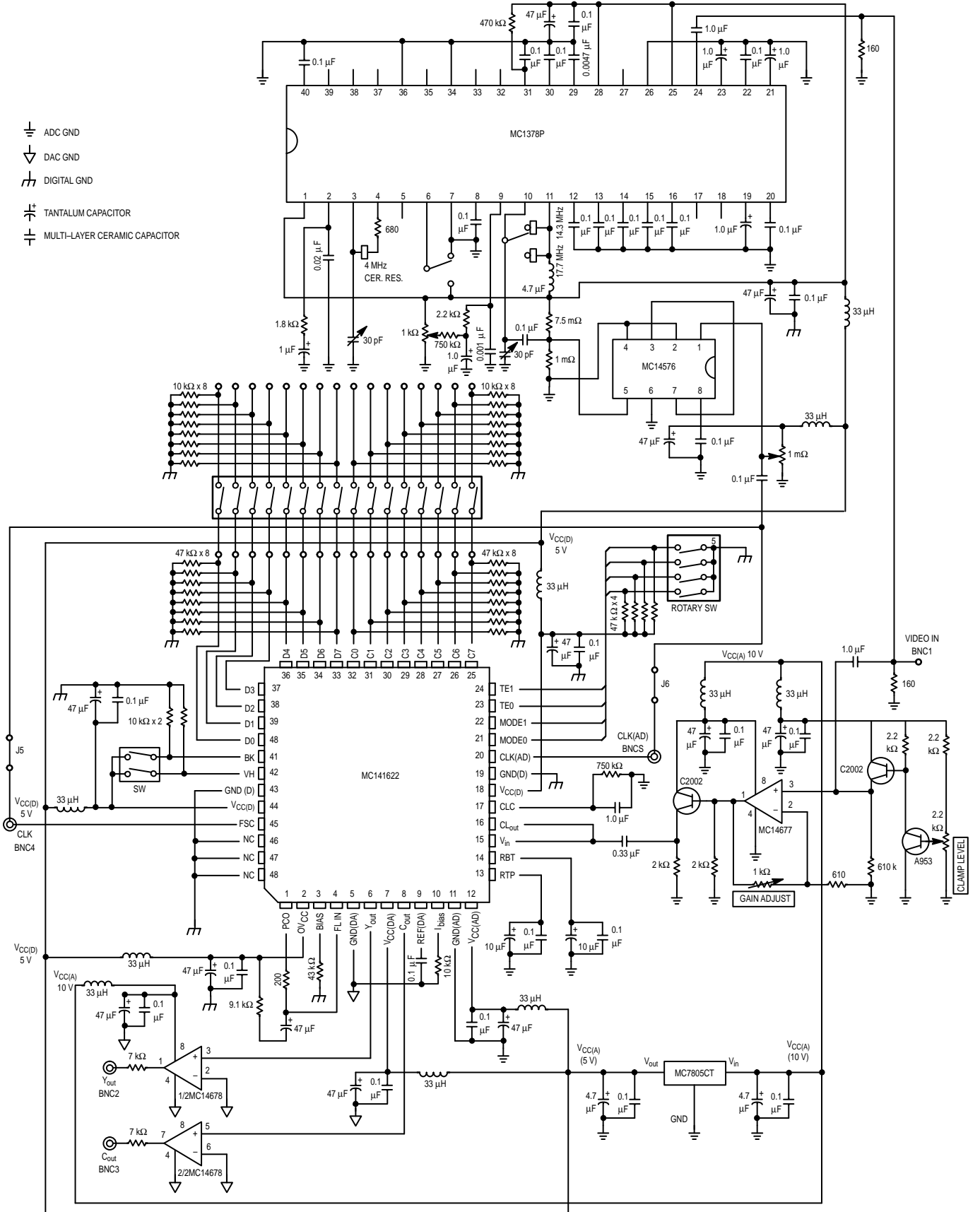
## 4.4 Outside Interface

The outside interface should provide a composite video input signal to BNC1. The MC141622EVK provides Y/C separation and outputs the luminance from BNC2 and the color signal from BNC3. There is an S output connector on this board for easy connection to instruments having an S input connector.

BNC4 and BNC5 are for the external input of each CLK and CLK(AD). However, when using these, it is necessary to modify the board pattern; i.e., cut (J5, J6).

There is no filter for bandwidth limitations on this board beyond that imposed by the bandwidth limitations of the MC14577 buffer amplifier. To minimize noise resulting from excessive bandwidth, the bandwidth of input video signal should be limited to no more than one half of the clock frequency.

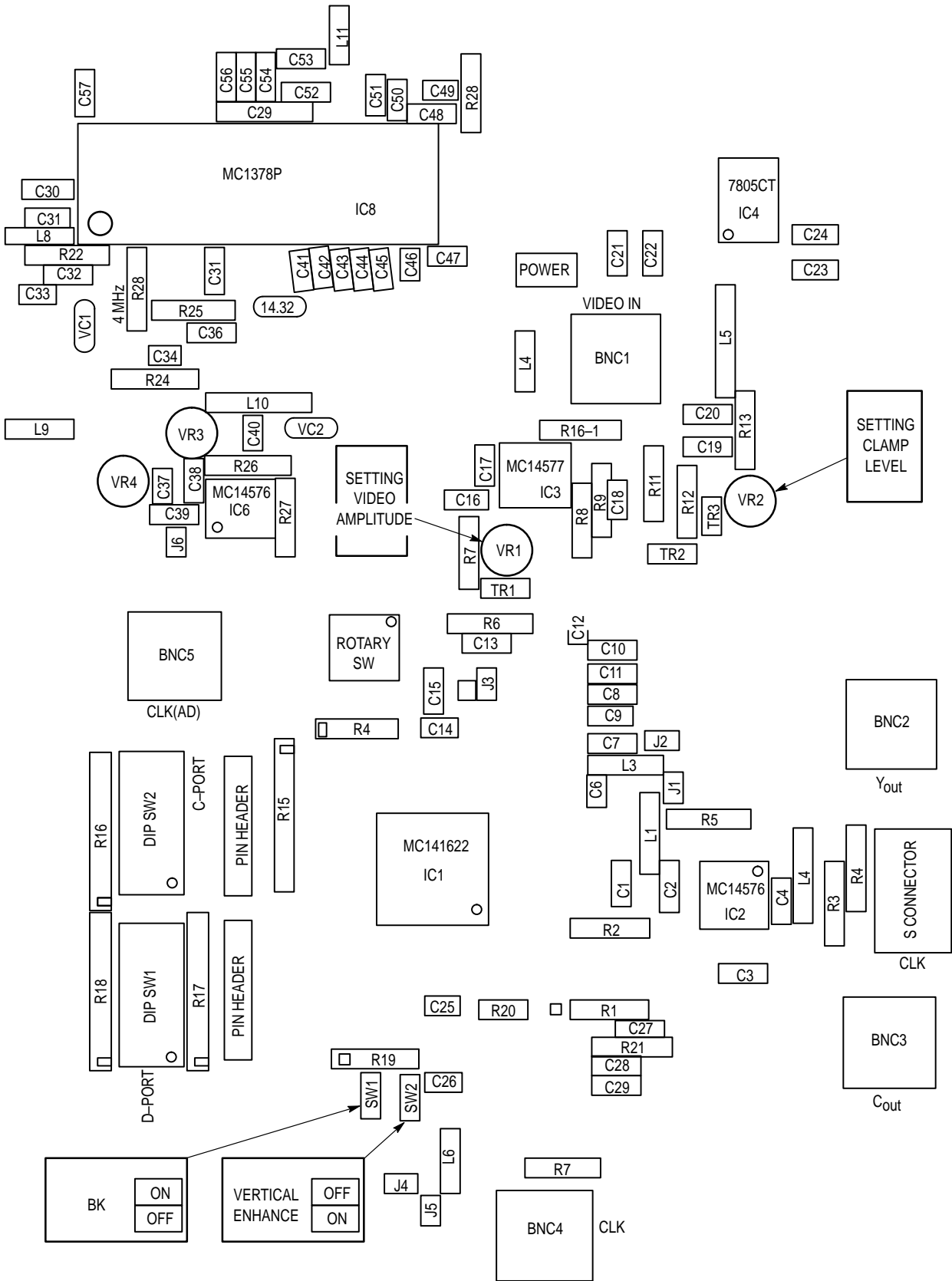
# 5. MC141622EVK CIRCUIT



## 6. MC141622EVK PARTS LIST

Reference Designation	Description	Reference Designation	Description
IC1	MC141622FU	C1	0.1 $\mu$ F
IC2	MC14576CP	C2, C3	47 $\mu$ F
IC3	MC14577CP	C4, C5, C6	0.1 $\mu$ F
IC4	MC7805CT	C7	47 $\mu$ F
IC5	MC14576CP	C8	0.1 $\mu$ F
IC6	MC1378P	C9	10 $\mu$ F
TR1	2SC2002	C10	0.1 $\mu$ F
TR2	2SC2002	C11	10 $\mu$ F
TR3	2SA953	C12	0.33 $\mu$ F
R1	9.1 k $\Omega$	C13	1.0 $\mu$ F
R2	62 k $\Omega$	C14, C15	0.1 $\mu$ F
R3, R4	75 $\Omega$	C16	47 $\mu$ F
R5	3.6 k $\Omega$	C17	0.1 $\mu$ F
R6	750 k $\Omega$	C18	1.0 $\mu$ F
R7, R8	2.0 k $\Omega$	C19	47 $\mu$ F
R9	510 $\Omega$	C20, C21	0.1 $\mu$ F
R10	150 $\Omega$	C22	47 $\mu$ F
R11	510 k $\Omega$	C23	0.1 $\mu$ F
R12, R13	2.2 k $\Omega$	C24	47 $\mu$ F
R14	47 k $\Omega$ x 4	C25	0.1 $\mu$ F
R15	47 k $\Omega$ x 8	C26	47 $\mu$ F
R16	10 k $\Omega$ x 8	C27	10 $\mu$ F
R17	47 k $\Omega$ x 8	C28	0.1 $\mu$ F
R18	10 k $\Omega$ x 8	C29, C30	47 $\mu$ F
R19, R20	10 k $\Omega$ x 4	C31	0.1 $\mu$ F
R21	200 $\Omega$	C32	0.022 $\mu$ F
R22	1.8 k $\Omega$	C33, C34	1.0 $\mu$ F
R23	680 $\Omega$	C35	0.1 $\mu$ F
R24	750 k $\Omega$	C36	0.001 $\mu$ F
R25	2.2 k $\Omega$	C37	47 $\mu$ F
R26	7.5 m $\Omega$	C38 – C45	0.1 $\mu$ F
R27	1.0 m $\Omega$	C46	1.0 $\mu$ F
R28	150 $\Omega$	C47, C48	0.1 $\mu$ F
R29	470 k $\Omega$	C49 – C51	1.0 $\mu$ F
L1 – L9	33 $\mu$ H	C52	0.1 $\mu$ F
L10	4.7 $\mu$ H	C53	47 $\mu$ F
L11	33 $\mu$ H	C54	0.047 $\mu$ F
VR1	1 k $\Omega$	C55 – C57	0.1 $\mu$ F
VR2	2.2 k $\Omega$		
VR3	1 k $\Omega$		
VR4	1 m $\Omega$		
VC1, VC2	30 pF		
SW1, SW2	Toggle Switch		
DIP SW1, DIP SW2	8 Channel Dip Switch		
ROTARY SW	16 Channel Switch		
	4 MHz Cer. Res		
	14.32 MHz Crystal		

# 7. MC141622EVK LAYOUT



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**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
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**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,  
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 81-3-3521-8315

**Mfax™:** RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609  
**INTERNET:** <http://www.mot.com/SPS/>

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



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