

MAXIM

MAX7428 Evaluation Kit

Evaluates: MAX7428

General Description

The MAX7428 evaluation kit (EV kit) is an assembled and tested circuit board that demonstrates the MAX7428 standard-definition video reconstruction filter and buffer. Windows® 98/2000 software provides a handy user interface to exercise the features of the MAX7428.

Order the complete EV system (MAX7428EVC16) for comprehensive evaluation of the MAX7428 using a PC. Order the EV kit (MAX7428EVKIT) if the 68HC16MODULE module has already been purchased with a previous Maxim EV system, or for custom use in other micro-controller (μ C) based systems.

MAX7428EVC16 Parts List

QTY	DESCRIPTION
1	MAX7428EVKIT
1	68HC16MODULE-DIP

REFERENCE	QTY	DESCRIPTION
C1, C4–C12	10	0.1 μ F, 10V X7R ceramic capacitors (0805)
C2	1	0.01 μ F, 10V X7R ceramic capacitor (0805)
C3	1	1000pF, 10V X7R ceramic capacitor (0805)
C13	1	10 μ F, 10V tantalum capacitor (B)
C14, C15, C16	3	220 μ F, 6V aluminum electrolytic capacitors (8 \times 10.5) Sanyo 6CV220EX
C17, C18, C19	0	Open (reserved for Sanyo 4CV820EX)
FB1, FB2	2	Ferrite beads (0805) Murata BLM21A102S
INA1, INA2, INA3, INB1, INB2, INB3, OUT1, OUT2, OUT3	9	BNC female jacks

Features

- ◆ Proven PC Board Layout
- ◆ Convenient On-Board Test Points
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	INTERFACE TYPE
MAX7428EVKIT	0°C to +70°C	User supplied
MAX7428EVC16	0°C to +70°C	Windows software

Component Supplier

SUPPLIER	TELEPHONE	FAX	WEBSITE
Sanyo USA	619-661-6835	619-661-1055	www.sanyo.com

Component List

REFERENCE	QTY	DESCRIPTION
J1	1	2 \times 20 right-angle socket
JU1–JU4	4	2-pin headers
R1, R2, R3	3	301k Ω \pm 1% surface-mount resistors (1206)
R4, R5, R6	3	75 Ω \pm 1% surface-mount resistors (1206)
R7	1	10k Ω \pm 5% surface-mount resistor (1206)
R8–R13	6	1M Ω \pm 5% surface-mount resistors (1206) (optional)
TB1	1	0.200in screw terminal block
U1, U2, U3	3	MAX7428EKA
None	1	PC board
None	1	3.5in software disk

Quick Start

Recommended Equipment

Before you begin, the following equipment is needed:

- MAX7428EVKIT and 68HC16MODULE interface board
- A small DC power supply, such as a 12VDC 0.25A plug-in transformer, or a 9V battery

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For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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- A computer running Windows 98/2000
 - A spare serial communications port, preferably a 9-pin plug
 - A serial cable to connect the computer's serial port to the 68HC16MODULE
- 1) With the power off, connect a 7VDC to 20VDC power supply to the μ C module at the terminal block located next to the on/off switch, along the top edge of the μ C module. Observe the polarity marked on the board.
 - 2) Carefully connect the boards by aligning the 40-pin header of the MAX7428 EV kit with the 40-pin connector of the 68HC16MODULE-DIP module. Gently press them together. The two boards should be flush against one another.
 - 3) Connect a cable from the computer's serial port to the μ C module. If using a 9-pin serial port, use a straight-through, 9-pin female-to-male cable. If the only available serial port uses a 25-pin connector, a standard 9-pin to 25-pin adapter is required. The EV kit software checks the modem status lines (CTS, DSR, DCD) to confirm that the correct port has been selected.
 - 4) Install the EV system software on your computer by running the INSTALL.EXE program on the floppy

Table 1. Jumper Functions

JUMPER	POSITION	FUNCTION
JU1	Closed	U1 common sync
JU1	Open*	U1 sync open
JU2	Closed	U2 common sync
JU2	Open*	U2 sync open
JU3	Closed	U3 common sync
JU3	Open*	U3 sync open
JU4	Closed*	U1, U2, U3 are powered by 5V from the 68HC16 module
JU4	Open	U1, U2, U3 require external 5V power source applied at terminal block TB1

*Indicates default configuration

- 5) Ensure that the jumper settings are in the default position (Table 1).
- 6) Turn on the power supply.
- 7) Start the program by opening its icon in the Start menu. The program prompts you to connect the μ C disk. The program files are copied and icons are created for them in the Windows Start menu.

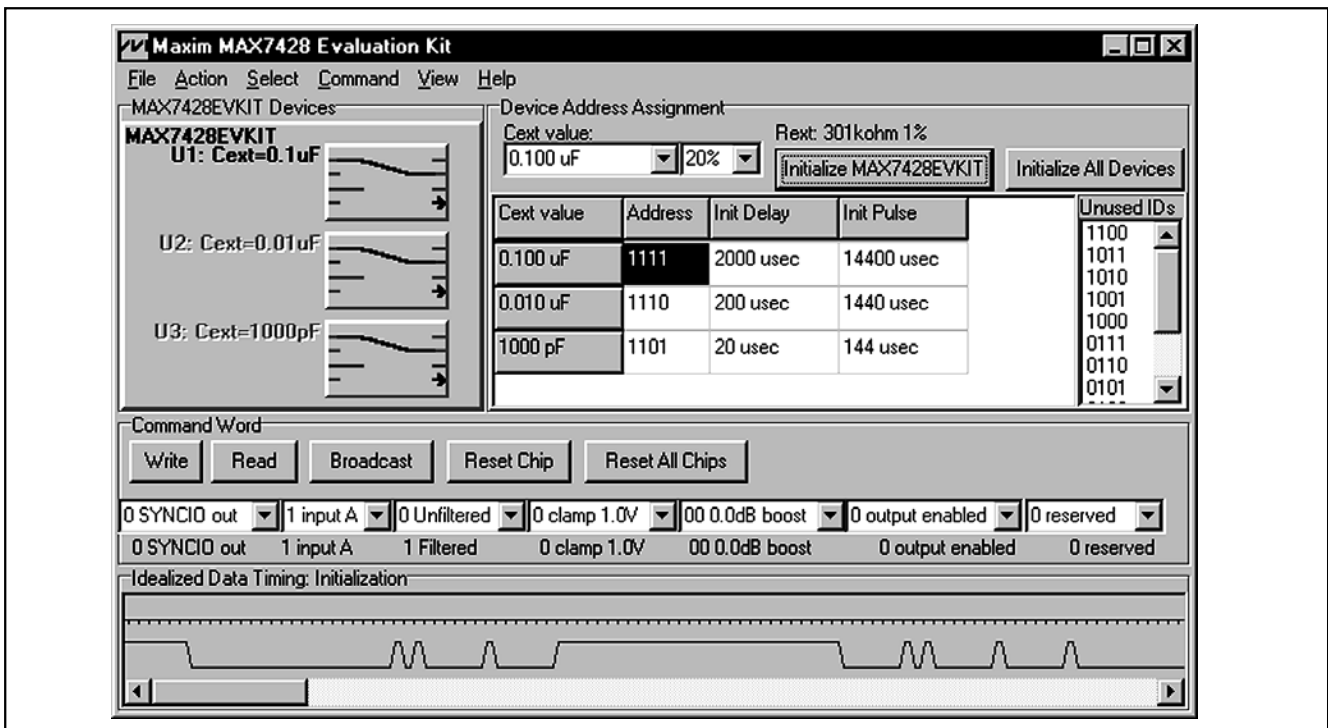


Figure 1. MAX7428EVKIT Software

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module and turns its power on. Slide SW1 to the ON position. Select the correct serial port, and click OK. The program automatically loads code into the module.

- 8) Click on Initialize MAX7428EVKIT to initialize the three devices on the MAX7428EVKIT board.
- 9) Connect video signal sources to INA1..INA3 and INB1..INB3.
- 10) Connect video display to OUT1..OUT3.
- 11) To verify the setup, switch all devices from input A to input B by selecting input B in the Control Word and then clicking Broadcast.

Detailed Description of Software

Selecting the Device Address

At power-on reset, all devices are assigned address 0000. To assign unique addresses, each device must be initialized, starting with the device with the largest C_{EXT} value. Clicking Initialize All Devices automatically assigns addresses from the Unused IDs list. Manually assign addresses by dragging the desired address from the Unused IDs list into the address assignment grid.

To reassign a chip's address, the chip must be reset. The Reset Chip button resets only the selected chip, while Reset All Chips broadcasts the reset command to all chips.

Select the desired chip by picking it from the address assignment grid, or by dropping down the C_{EXT} capacitor combo box.

Controlling the MAX7428

Set the command word drop-down combo boxes (SYNCIO, Input A/B, Filtered/Unfiltered, etc.). To write to a single device, click the Write button. To write to all devices, click the Broadcast button. To read back the device configuration, click the Read button. Readback data appears underneath the combo boxes.

Detailed Description of Hardware

Master/Slave Synchronization

One MAX7428 can control the clamping on the other two. First, assign unique chip addresses by clicking Initialize MAX7428EVKIT. Next, set the configuration word to SYNCIO in and click Broadcast. Finally, select the device that is the master, and write configuration word with SYNCIO out. Connect the sync signals together by closing jumpers JU1, JU2, and JU3.

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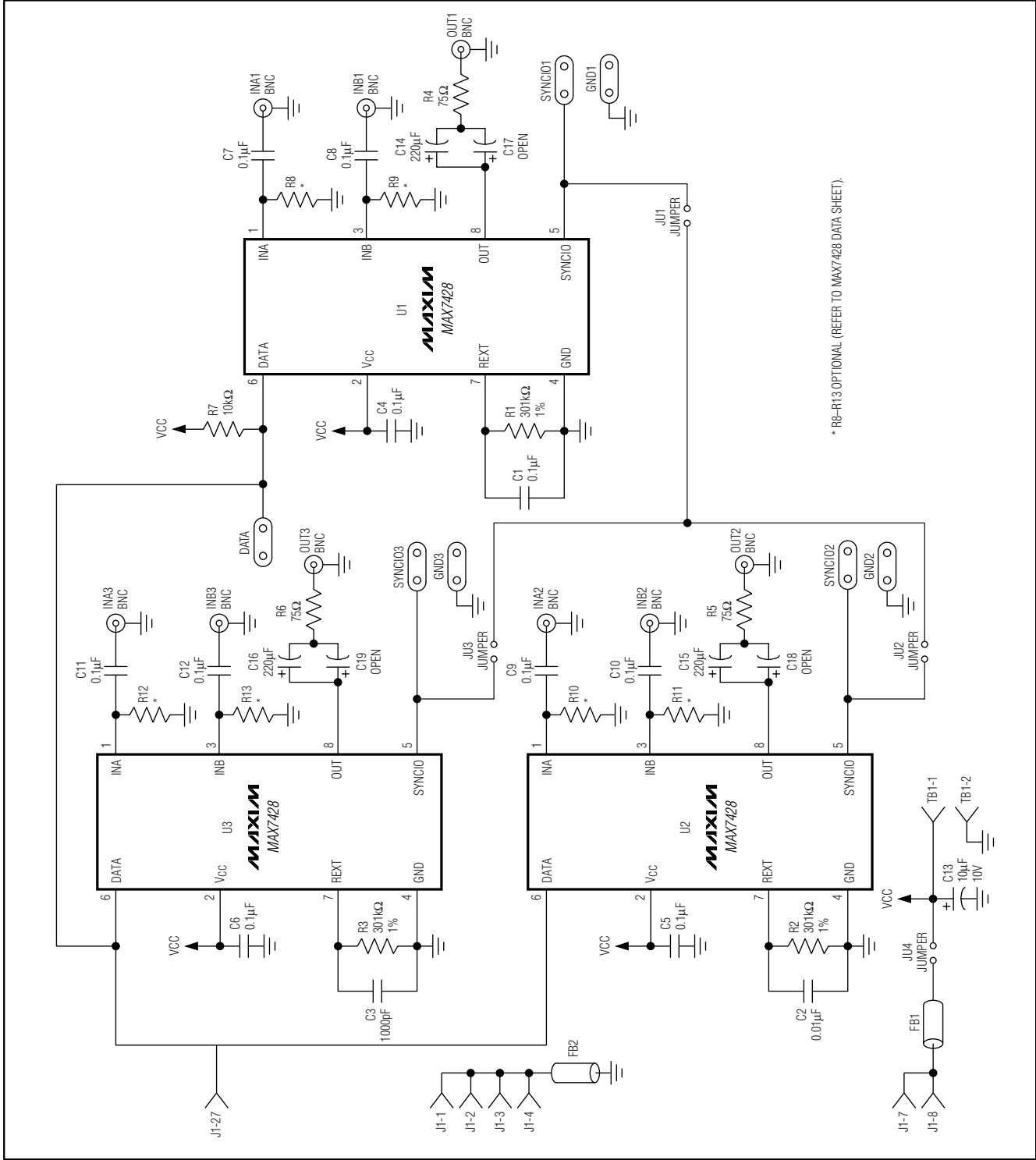


Figure 2. MAX7428 EV Kit Schematic

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```
; Maxim One-Pin Protocol used on MAX7428 (Excerpt)
; Complete source code is included on MAX7428 EVKIT disk.
;
; High-level GUI program sends commands to the MOPP code.
; On Entry:   register Z points to null-terminated command string.
; On Exit:   _readback contains the value read by the (R) bits.
CmdWLoop:
    ldaa 0,z        ; get first character
    aiz #1         ; increment string pointer
    cmpa #0        ; null character terminates command string
    beq CmdWDone
    cmpa #'0'      ; digit zero makes a 5usec pulse
    bne CmdWNot0
    ldd #DoZeroTimingValue
    jsr DoPulse_D ; call delay subroutine, delay value in register D
    bra CmdWLoop  ; jump back to loop, process next character
CmdWNot0:
    cmpa #'1'      ; digit one makes a 30usec pulse
    bne CmdWNot1
    ldd #DoOneTimingValue
    jsr DoPulse_D ; call delay subroutine, delay value in register D
    bra CmdWLoop  ; jump back to loop, process next character
CmdWNot1:
    cmpa #'2'      ; digit two makes a 100usec pulse
    bne CmdWNot2
    ldd #DoWPTimingValue
    jsr DoPulse_D ; call delay subroutine, delay value in register D
    bra CmdWLoop  ; jump back to loop, process next character
CmdWNot2:
    cmpa #'A'      ; letter A makes long delay before initialization
    bne CmdWNotA
    jsr EXECUTE_DELAY_A
    bra CmdWLoop  ; jump back to loop, process next character
CmdWNotA:
    cmpa #'B'      ; letter B makes long delay during initialization
    bne CmdWNotB
    jsr EXECUTE_DELAY_B
    bra CmdWLoop  ; jump back to loop, process next character
CmdWNotB:
    cmpa #'H'      ; letter H makes 5usec delay without pulsing the data signal
    bne CmdWNotH
    ldd #DoWH5usecTimingValue
    jsr DoPulseDly ; call idle delay subroutine, delay value in register D
    bra CmdWLoop  ; jump back to loop, process next character
CmdWNotH:
    cmpa #'R'      ; letter R samples input from MAX7428 (LSB first)
    bne CmdWNotR
    ; make data an input...
    BCLR PDDR,#BitBangPin ; make SHDN an input, so it floats.
    ; with no delay code: 5.20 usec from end of prompt to sample
    ; read data value...
    ldaa GPTPDR
    BCLR GPTPDR,#DebugReadPin ; debug strobe
    aslw _readback,y
    anda #BitBangPin ; drive I/O high
    cmpa #0
    beq CmdWRskip
    inc _readback+1,y
CmdWRskip:
    ; make data an output
    BSET GPTPDR,#DebugReadPin ; debug strobe
    BSET GPTPDR,#BitBangPin ; drive I/O high
    BSET PDDR,#BitBangPin ; make sure SHDN is an output
    bra CmdWLoop ; jump back to loop, process next character
CmdWNotR:
    bra CmdWLoop ; all other characters are ignored
    bra CmdWLoop ; jump back to loop, process next character
CmdWDone:
    rts ; return to main program
```

Listing 1. Simplified Interface

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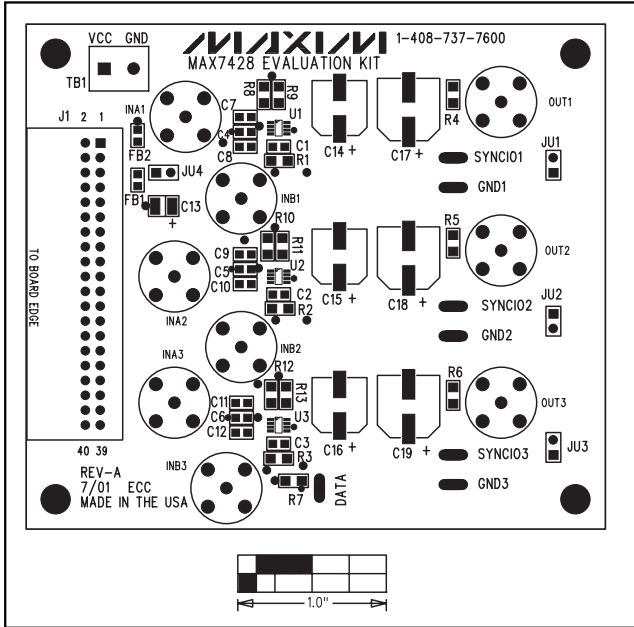


Figure 3. MAX7428 EV Kit Component Placement Guide—Component Side

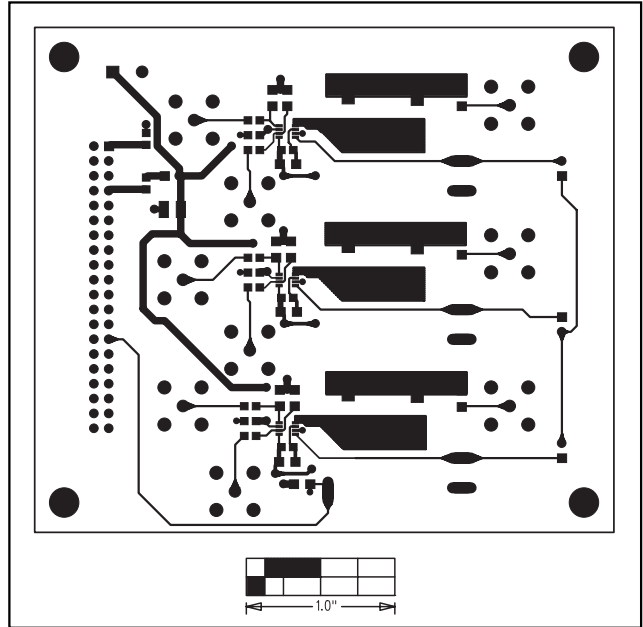


Figure 4. MAX7428 EV Kit PC Board Layout—Component Side

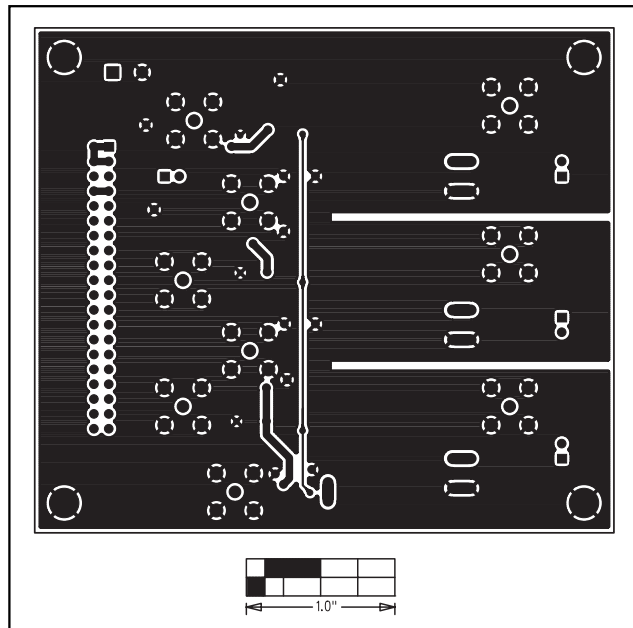


Figure 5. MAX7428 EV Kit PC Board Layout—Solder Side

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