

MAXIM

MAX1875 Evaluation Kit

General Description

The MAX1875 evaluation kit (EV kit) demonstrates a low-cost application circuit. This dual-PWM synchronous DC-to-DC converter operates from unregulated AC adapters and generates precision, low-voltage rails for broadband gateways, digital TVs, cable modems, and set-top boxes.

The MAX1875 EV kit provides dual 1.8V and 3.3V output voltages from an 8V to 18V input voltage range. It delivers up to 3.5A output current for the 1.8V output and the 3.3V output, with greater than 90% efficiency. Both converters operate 180 degrees out-of-phase to reduce input ripple current. The EV kit operates at 100kHz switching frequency.

This EV kit is a fully assembled and tested circuit board. It also allows evaluation of other output voltages in the 0.75V to 15V range.

The MAX1875 EV kit can also be used to evaluate the MAX1876 and MAX1858.

Features

- ◆ 8V to 18V Input Voltage Range
- ◆ 1.8V and 3.3V Adjustable Output Voltages
- ◆ 3.5A Output Current (1.8V Output)
- ◆ 3.5A Output Current (3.3V Output)
- ◆ Lossless Foldback Current Limit
- ◆ 100kHz Switching Frequency
- ◆ RST Output with 140ms Delay (MAX1876/MAX1858 only)
- ◆ 180 Degree Out-of-Phase Operation
- ◆ 24-Pin QSOP Package
- ◆ Low-Cost Components
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX1875EVKIT	0°C to +70°C	24 QSOP

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C4	2	390μF, 25V aluminum electrolytic capacitors Sanyo 25MV390AX
C5, C6, C12	3	0.1μF ceramic capacitors (0805)
C7	1	0.39μF ceramic capacitor (0805)
C8	1	0.33μF ceramic capacitor (0805)
C9, C10, C11, C13, C14	5	470μF, 10V aluminum electrolytic capacitors Sanyo 10MV470AX
C17	1	2200pF ceramic capacitor (0805)
C18	1	1500pF ceramic capacitor (0805)
C19	1	0.22μF, 16V X5R ceramic capacitor (0805) Taiyo Yuden EMK212BJ224KG
C20	1	4.7μF, 10V X5R ceramic capacitor (1206) Taiyo Yuden LMK316BJ475ML
C21	1	0.22μF, 50V X7R ceramic capacitor (0805) Taiyo Yuden UMK212BJ224MG or TDK C2012X7R1H224M
C22, C23	2	0.01μF ceramic capacitors (0805)
C2, C3, C15	0	Not installed (open)
D1	1	100mA, 30V dual Schottky diode 23-pin SOT Central Semiconductor CMPSH-3A
L1	1	15μH 5A power inductor

DESIGNATION	QTY	DESCRIPTION
L2	1	27μH 5A power inductor
N1A, N1B, N2A, N2B	2	Dual N-channel MOSFETs 8-pin SO Fairchild FDS6990A
D2–D5	0	Not installed (open)
R1	1	8.06kΩ ±1% resistor (0805)
R2, R4	2	10kΩ ±1% resistors (0805)
R3	1	23.2kΩ ±1% resistor (0805)
R5	1	60.4kΩ ±1% resistor (0805)
R6	1	2.7kΩ ±5% resistor (0805)
R7	1	2kΩ ±5% resistor (0805)
R8	1	49.9kΩ ±1% resistor (0805)
R9	1	69.8kΩ ±1% resistor (0805)
R10	1	100kΩ ±5% resistor (0805)
R11	1	20Ω ±5% resistor (0805)
R12, R13	2	3.9Ω ±5% resistors (0805)
R14	1	154kΩ ±1% resistor (0805)
R15	1	84.5kΩ ±1% resistor (0805)
JU1, JU2	2	3-pin headers
U1	1	MAX1875EEG 24-pin QSOP
None	2	Shunts
None	1	MAX1875 PC board

MAX1875 Evaluation Kit

Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
Central Semiconductor	516-435-1110	516-435-1824	www.centalsemi.com
Fairchild	408-721-2181	408-721-1635	www.fairchildsemi.com
Nihon	847-843-7500	847-843-2798	www.niec.co.jp
Sanyo	619-661-6835	619-661-1055	www.sanyovideo.com
Taiyo Yuden	408-573-4150	408-573-4159	www.t-yuden.com
TDK	847-390-4373	847-390-4428	www.component.tdk.com
Tyco Electronics (Transpower)	888-978-2638	605-886-8995	www.trans-power.com

Note: Please indicate that you are using the MAX1875 when contacting these component suppliers.

Quick Start

Before beginning, the following equipment is required:

- 8V to 18V power supply
- Electronic loads capable of sinking 3.5A each
- Digital multimeters (DMMs)
- 100MHz dual-trace oscilloscope

Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Ensure that the circuit is connected correctly to the supply and electronic loads before applying any power. Set electronic loads in resistive mode.
- 2) Verify that the shunts are across JU1 pins 1 and 2 as well as JU2 pins 2 and 3.
- 3) Turn on power supply.
- 4) Verify that the output voltages are 1.8V and 3.3V.

Evaluating Other Output Voltages

The EV kit outputs are programmed for 1.8V and 3.3V. However, the output voltages can also be adjusted between 1V and 15V by selecting R1/R2 and R3/R4 values. Select the feedback resistors R2 and R4. R1 and R3 are then given by:

$$R1 \text{ (or } R3) = R2 \text{ (or } R4) \times [(V_{OUT} / V_{FB}) - 1]$$

where $V_{FB} = 1V$. Refer to the MAX1875 data sheet for selection of output capacitors, inductors, and compensation networks.

Evaluating the MAX1876 and MAX1858

Replace U1 with the MAX1876/MAX1858.

Jumper Settings

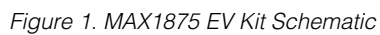
Table 1. Jumper JU1 Functions (EN Mode Selection)

JU1	EN PIN	MAX1875 OUTPUT
1 and 2	Connected to VL	MAX1875 enabled, $V_{OUT1} = 1.8V$, $V_{OUT2} = 3.3V$
2 and 3	Connected to GND	Shutdown mode, $V_{OUT1} = 0V$, $V_{OUT2} = 0V$
Not Installed	Connected to EN pad	MAX1875 must be enabled by an external signal

Table 2. Jumper JU2 Functions (SYNC Mode Selection)

JU2	SYNC PIN	EFFECT
1 and 2	Connected to VL	Used to sync up an additional MAX1875. CKO is 2x DH1 and phase shifted by 90 degrees.
2 and 3	Connected to GND	Used to sync up an additional single buck. CKO is the same frequency and phase as DH1.
Not Installed	Connected to SYNC pad	External clock is applied to SYNC input (200kHz typ)

Evaluates: MAX1875/MAX1876/MAX1858



MAX1875 Evaluation Kit

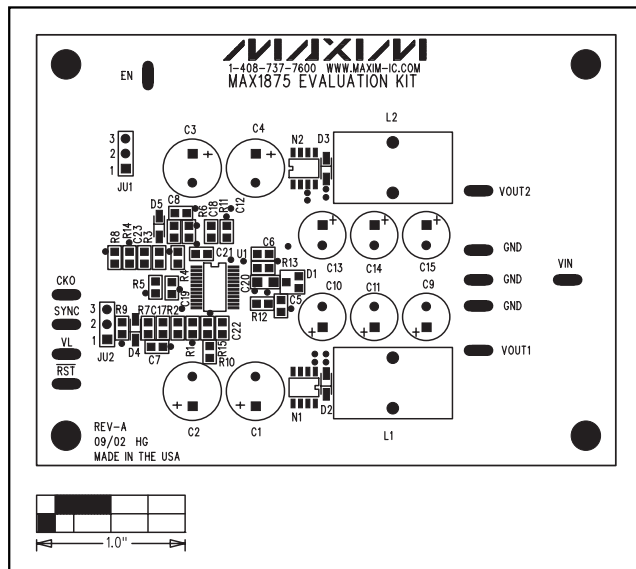


Figure 2. MAX1875 EV Kit Component Placement Guide—Top Silkscreen

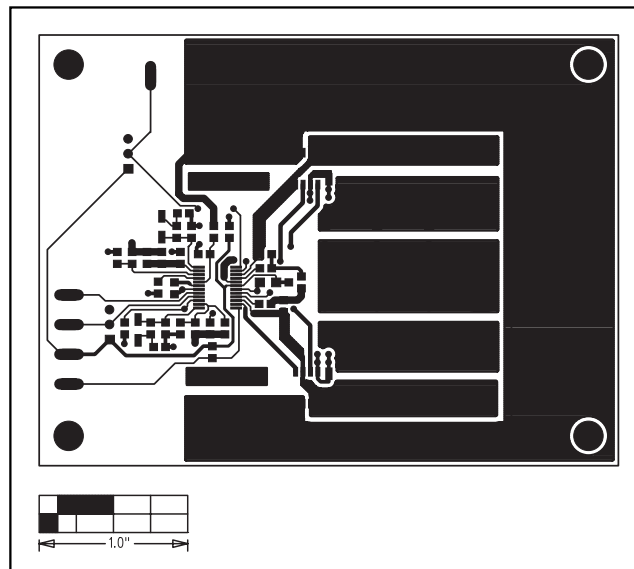


Figure 3. MAX1875 EV Kit PC Board Layout—Component Side

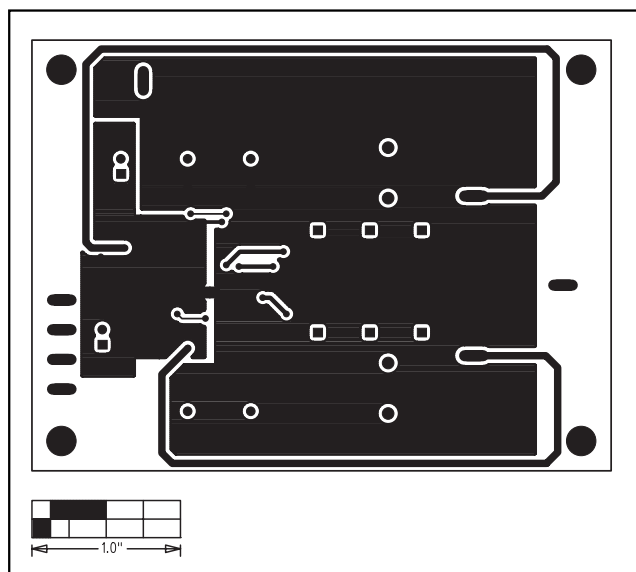


Figure 4. MAX1875 EV Kit PC Board Layout—Solder Side

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4 _____ **Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 408-737-7600**