

### FEATURES

- **V.32, V.34, and V.90 (56 Kb/s) Compatibility**
- **Supports Ring Detect and Wake On Ring**
- **On-hook Monitor Provides for Caller ID and Voice/Fax/Data Steer Functions**
- **On-hook Line Voltage Measurement**
- **Line Current Sense**
- **3.0 Volt (Modem Side) Operation**
- **Low Gain Drift**
- **Universal Applications**
- **100% Low Profile Surface Mount**
- **Compatible to FCC Part 68**

### DESCRIPTION

The DM207 is one component in the DAA2000 circuit, which consists of a DL207 Line-Side Integrated Circuit, a DM207 Modem-Side Integrated Circuit and two IL388DAA Linear Optocouplers. When configured along with other components, the final circuit provides a full featured Optical DAA.

All of the components in the kit are packaged in easy to assemble, surface mount format. The DM207 comes in a standard 24-pin TSSOP package. A complete DAA circuit can be assembled directly onto a mother board using less than 2 square inches of board space, eliminating costly special or hand insert operations.

The DAA2000 is a full featured Optical DAA that takes into consideration the needs of today's portable and multimedia equipment. Added features of the DAA2000 such as line current sense, snooping and line V/F make the circuit ideal for enhanced modems which support speaker phones, answering machines, simultaneous voice and fax, caller ID and voice/fax/data steering.

The DAA2000's unique "Wake on Ring" feature allows it to draw no current when idle until ringing is detected. The DAA2000 circuit may be powered from an unregulated power source such as a battery up to 7.0 volts.

### Maximum Ratings

Supply voltage, $V_{DD}-V_{SS}$ .....	7.0 V
Input voltage.....	$V_{SS}-0.5$ V to $V_{DD}+0.5$ V
Package dissipation at 25°C ambient.....	1.2 W
Derate linearly from 25°C.....	0.03 W/°C
Storage temperature.....	-20°C to +85°C
Operating temperature.....	0°C to +70°C

**Table 1. Pin Configurations—DM207 (Modem Side)**

Pin	Symbol	I/O	Function
1, 24	C1A, C1B		Capacitor—A 15 nF capacitor (C1) is tied between pin #1 and pin #24. This controls the RC time constant for the receive optical active bias control.
2	VREF	O	Internal 1.25 V precision bandgap reference. Active when Off-hook or in On-hook Monitor mode only. Do not load this output with more than 1.0 $\mu$ A.
3	C2		Capacitor—Typically this 68 nF capacitor (C2) is tied between pin #3 and ground. C2 sets the integrator response for the lowpass filter of the optical active bias circuit.
4	RXCT	O	RX Cathode—The receiver photo diode return is connected to pin #7 of the IL388DAA (U3).
5	RXAN	I	RX Anode—The receive photo diode input and is connected to pin #8 of the IL388DAA (U3). This input is sensitive to noise relative to $V_{SS}$ and should be routed to minimize pickup from other signal sources.
6	ONHKML	I	On-hook Monitor Low—Logic Low activates the On-hook Monitor function, which includes an internal pull-up resistor.
7	ONHKM	I	On-hook Monitor—Logic High activates the On-hook Monitor function, which includes an internal pull down resistor.
8	HIN		Diagnostic pin. Do not connect.
9	SRVAN	I	Servo Anode—The transmit servo photo diode input is connected to pin #3 of the IL388DAA (U4). This input is sensitive to noise level relative to $V_{DD}$ and should be routed to minimize pickup from other signal sources.
10	SRVCT	O	Servo Cathode—The transmit servo photo diode current return and is connected to pin #4 of the IL388DAA (U4). This pin is clamped at 0.8 V.
11	TXAMP	I	TX Amplifier Input—The current (summing mode) input for transmit audio. This input is at ACREF voltage $\pm 5.0$ mV. A 120 k resistor between this point and transmit audio source gives unity voltage gain into the telephone line.
12	$V_{DD}$	P	Power supply voltage. 3.0 to 7.0 V.
13	LEDCT	O	LED Cathode—The transmit linear optocoupler LED cathode is connected to pin #1 of the IL388DAA (U4). The printed circuit board layout should minimize capacitive coupling between this trace and the SRVAN and RXAN traces.
14	$V_{SS}$	P	Power supply return (Ground).
15	AUDOUT	O	Auxiliary amplifier output— will drive a 300 $\Omega$ load.
16	AUDIN	I	Inverting input for an auxiliary amplifier. The non-inverting input is internally tied to ACREF.
17	TXBIAS	O	A 25.5 k, 1% resistor to ground sets the transmit DC bias point of U4.
18	ACREF	I/O	Audio DC reference for transmit and receive signals. 1.25 V reference @ 1.0 $\mu$ A maximum output. It can be overdriven by connecting an external voltage source. This output is turned off during idle mode (On-hook, and no snoop).
19	RXOUT	O	Audio Output –6.0 dB relative to the telephone line. It has 300 $\Omega$ drive capability. This output goes to a high impedance state in idle mode. DC voltage is ACREF.
20	OFFHK	I	OFF-HOOK—Positive assertion Off-hook control input. Includes an internal pull-down resistor.
21	OFFHKL	I	OFF-HOOK LOW—Negative assertion Off-hook control input. Includes an internal pull-up resistor
22	RNG	O	RING Detect—In IDLE modes it outputs a 4 ms positive pulse for each full cycle or half cycle depending on the value of pin #7 on the DL207. In snoop or Off-hook modes, the output is the same as LSTAT.
23	LSTAT	O	Line Status—In idle mode, this pin outputs a series of pulses whose frequency is directly related to line voltage (V/f function). In snoop or Off-hook modes, the output will give a single pulse if the line current is suddenly decreased indicating a parallel phone going Off-hook.
24	C1A		See above – pin #1.

**Table 2. DAA Circuit Operating Characteristics,  $T_A=25^\circ\text{C}^*$**

Parameter	Min.	Typ.	Max.	Unit
Ring Detection Threshold	—	15	—	$V_{\text{RMS}}$
Ringer Equivalent Load	—	0.65	—	REN
Transmit THD	—	-70	—	dB
Receive THD	—	-70	—	dB
Transmit in band noise	—	-80	—	dBm
Receive in band noise	—	-80	—	dBm
Transmit Frequency Response, -3.0 dB	100	—	80,000	Hz
Receive Frequency Response, -3.0 dB	100	—	80,000	Hz
Transmit Signal Level	—	—	+3.0	dBm
Receive Signal Level	—	—	+3.0	dBm
Transhybrid Loss	10	20	—	dB
Return Loss	10	30	—	dB
Off-hook AC impedance (Fig. 1)	—	600	—	$\Omega$
On-hook AC impedance (Fig. 1)	150 k	—	—	$\Omega$
On-hook DC resistance	10 M	—	—	$\Omega$
Leakage to ground	100 M	—	—	$\Omega$
Transmit Gain	-0.5	0	+0.5	dB
Receive Gain	-7.0	-6.0	-5.0	dB
Loop DC current	15	—	120	mA
Current Limit Threshold	130	—	160	mA
Isolation Voltage, T & R to ground	2500	—	—	V
Supply Voltage (modem side)	3.0	—	7.0	V
Supply Current (modem side, active)	—	10	—	mA
Command input level (HIGH)	2.7	—	—	V
Command input level (LOW)	—	—	0.7	V

**Note:**

\* Based on Figure 2. Some parameters can be affected by external components.

**Figure 1. DAA2000 Functional Block Diagram**

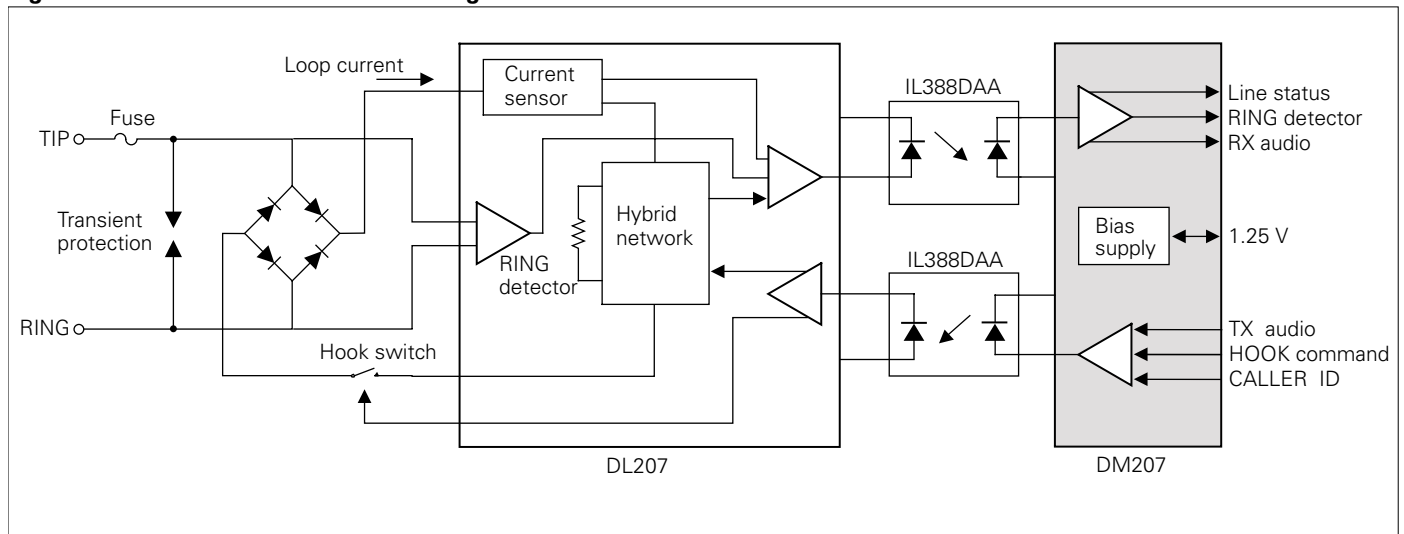
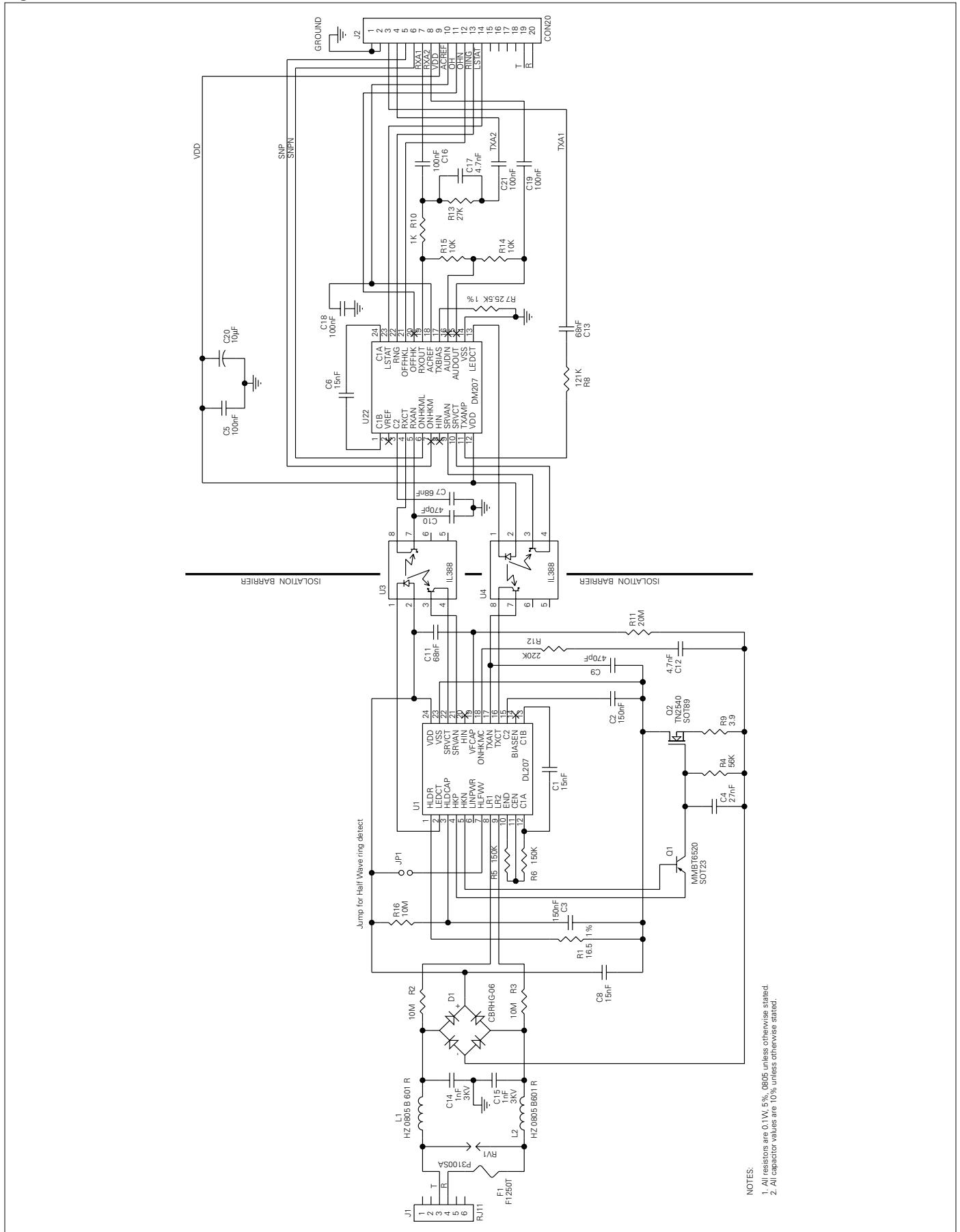


Figure 2. DAA2000 Reference Schematic (North American Version)



NOTES:  
 1. All resistors are 0.1W, 5%, 0905, unless otherwise stated.  
 2. All capacitor values are 10% unless otherwise stated.