



# SPRAGUE

THE MARK OF RELIABILITY

(Specifications Subject to Change Without Notice)  
May 13, 1984

## ULN-3862A

Integrated Circuits

SEMICONDUCTOR GROUP

## ULN-3862A LOW-POWER F-M I-F SYSTEM

### FEATURES

- Wide Operating Voltage Range
- Low Quiescent Supply Current
- High Sensitivity
- Operating Frequency to 60 MHz
- Low External Parts Count
- 16-Pin Dual In-Line Package
- Interchangeable With MC3361P

**S**PECIFICALLY DESIGNED for use in cordless telephone applications, the ULN-3862A F-M I-F circuit operates from supply voltages as low as 2.0 V and consumes just 4.2 mA in the standby mode. Two carbon-zinc AA batteries will operate the device until they are almost exhausted.

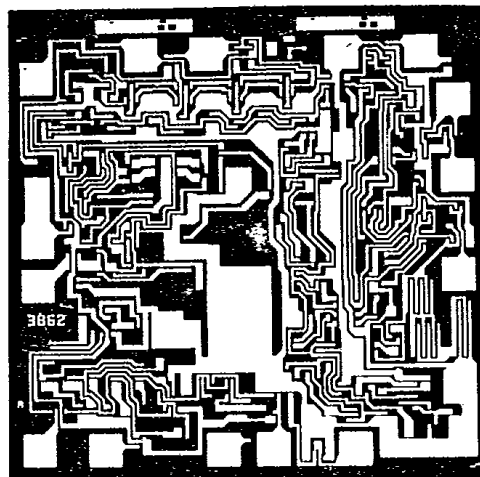
Although the most common applications use a 10.7 MHz first I-F and a 455 kHz second I-F, the mixer will operate at other R-F or I-F input frequencies to 60 MHz. The high-gain multi-stage differential amplifier/limiter is capable of operation at well in excess of 1 MHz.

The ULN-3862A typically performs the second conversion and detection in narrow-band F-M receivers. It includes a high-frequency oscillator, mixer, an amplifier/limiter, quadrature discriminator (requiring only a single low-cost tuned circuit), active filter, squelch, scan controller, and mute circuitry.

The I-F system meets the low-power requirements of portable radio designs and meets the stability requirements of many automotive commu-

nications applications. Internal voltage regulators and bias supplies ensure stable performance despite variations in external supply voltage (2 V to 8 V) or temperature (-20°C to +85°C).

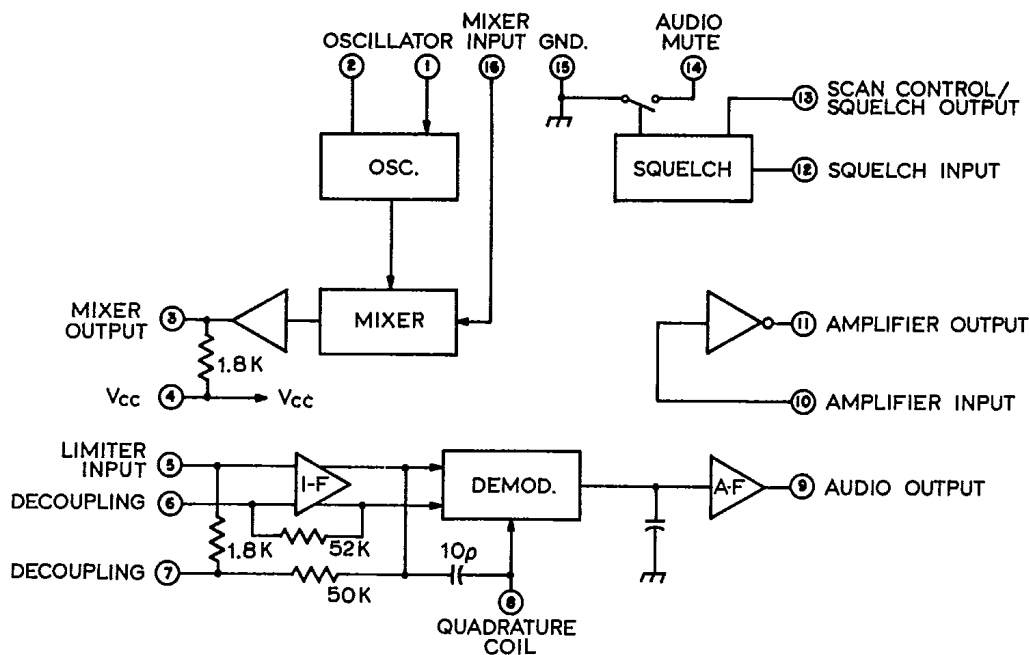
The ULN-3862A is supplied in a standard 16-pin plastic dual in-line package. Unless otherwise specified, it is branded with both the Sprague part number and the original source part number (MC3361P); however, the Sprague part number should be used on orders and in correspondence.



### ABSOLUTE MAXIMUM RATINGS

Supply Voltage, $V_{CC}$ .....	10 V
Detector Input Voltage, $V_8$ .....	1.0 Vpp
Mixer Input Voltage, $V_{16}$ .....	1.0 Vrms
Mute Input Voltage Range, $V_{14}$ .....	-0.5 Vp to 5.0 Vp
Operating Temperature Range, $T_A$ .....	-20°C to +85°C
Storage Temperature Range, $T_S$ .....	-65°C to +150°C

## FUNCTIONAL BLOCK DIAGRAM

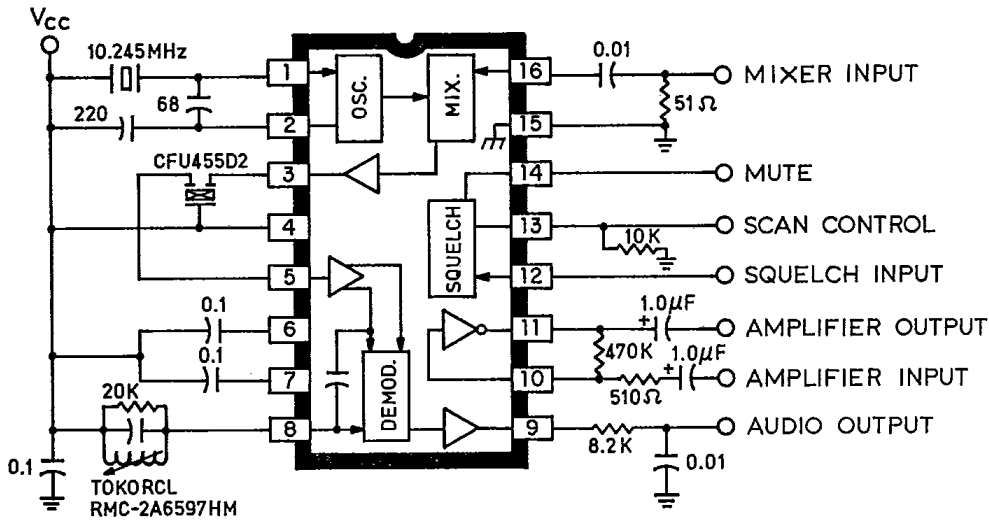


Dwg. No. A-12,577

**ELECTRICAL CHARACTERISTICS** at  $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 4.0\text{ V}$ ,  $f_o = 10.7\text{ MHz}$ ,  $\Delta f = \pm 3.0\text{ kHz}$ ,  $f_m = 1.0\text{ kHz}$   
(unless otherwise noted)

Characteristic	Test Pin	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Functional Supply Voltage Range	4		2.0	—	8.0	V
Quiescent Supply Current	4	Squelch OFF	—	4.2	7.0	mA
		Squelch ON	—	5.4	9.0	mA
Input Limiting Threshold	16	-3 dB Limiting	—	2.0	6.0	$\mu\text{V}$
Mixer Conversion Gain	3		—	24	—	dB
Mixer Input Resistance	16		—	3.3	—	k $\Omega$
Mixer Input Capacitance	16		—	2.2	—	pF
Filter Gain	11	$f = 10\text{ kHz}$ , $V_{in} = 5\text{ mVrms}$	40	48	—	dB
Filter Output Voltage	11		0.7	1.7	2.5	V
Squelch Hysteresis	12		—	80	—	mV
Mute Switch Resistance	14	Mute Low	—	10	—	$\Omega$
		Mute High	—	10	—	M $\Omega$
Scan Function Low (Mute OFF)	13	$V_{12} = 1\text{ V}$	—	—	500	mV
Scan Function High (Mute ON)	13	$V_{12} = 0\text{ V}$	3.0	3.8	—	V
Recovered Audio Output	9	$V_{in} = 10\text{ mVrms}$	100	150	270	mVrms
Audio Output Impedance	9		—	450	—	$\Omega$
Quiescent D-C Output Voltage	9		—	1.7	—	V

# TEST CIRCUIT



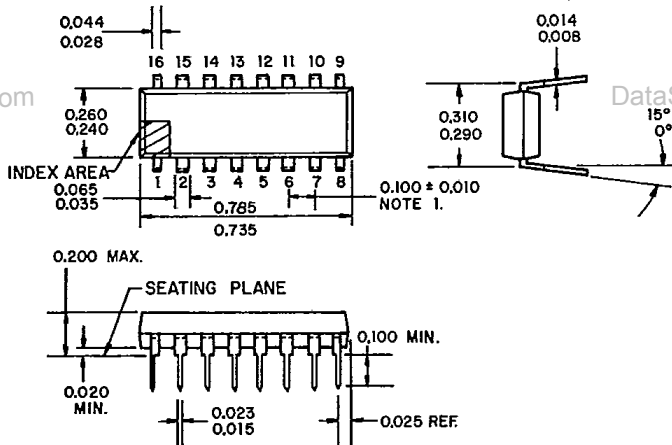
Capacitance values > 1 in pF.  
 Capacitance values < 1 in  $\mu$ F  
 unless otherwise indicated.

Dwg. No. A-12,578

## QUIESCENT D-C PARAMETERS at $T_A = +25^\circ\text{C}$ , $V_{CC} = 4.0\text{ V}$

Pin	Typical Value
1	3.9 V
2	3.2 V
3	3.65 V
4	4.0 V
5	2.9 V
6	2.9 V
7	2.9 V
8	3.95 V
9	1.7 V
10	750 mV
11	1.7 V
12	0 V
13	3.6 V
14	1.0 mV
15	0 V
16	1.7 V

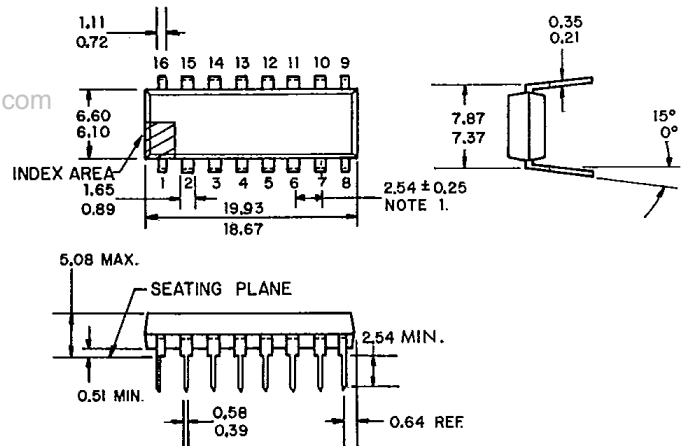
### DIMENSIONS IN INCHES



Dwg. No. A-6402C IN

### DIMENSIONS IN MILLIMETRES

Based on 1 in. = 25.4 mm



Dwg. No. A-6402C MM

#### NOTES:

1. Lead spacing tolerance is non-cumulative.
2. Exact body and lead configuration at vendor's option within limits shown.
3. Lead gauge plane is 0.030 in. (0.76 mm) max. below seating plane.