

Speaker and Speaker-Strobe

964 & 965 Series

Features

- **UL 1971-listed synchronizing strobe**
Integrity strobes synchronize to the latest UL 1971 requirements when used with an external control module (G1M or SIGA-CC1S).
- **Genesis-compatible**
Can be mixed with Genesis signals. All Genesis and Integrity strobes on the same circuit meet UL 1971 synchronization requirements when used with an external control module.
- **Approved for public and private mode applications**
UL 1971-listed as signaling devices for the hearing impaired *and* UL 1638-listed as protective visual signaling appliances.
- **High dBA Output**
High efficiency, sealed mylar speaker cone produces a loud 90 dBA at 2 watts.
- **25 and 70 volt RMS models**
All speakers include a DC Blocking Capacitor for audio circuit supervision.
- **Field changeable field markings**
Lens language or standard "FIRE" marking is easily changed with optional LKW and LKC series lens kits.
- **Easy Installation**
Flush mount to standard North American four-inch square box with 2-1/8 inch (54 mm) extension ring.

Description

EST's 964 and 965 Series Speaker and Speaker-Strobes are designed for broadcasting high quality, integrated emergency voice communications, and alert or alarm tone signals. Use them in life safety applications, especially to notify the hearing impaired, where transitory people are expected such as hotels, malls, airports, hospitals and other public buildings.

The 7.35 inch (187 mm) diameter steel baffle is finished with an attractive yet durable, high quality, baked white epoxy polyester powder coat. An optional red finish is available. The speakers mount to standard four-inch square electric box with extension ring or to EST's 960A Series flush boxes. EST flush boxes are made from satin coat steel and have flexible mounting straps for using with poured concrete forms.

SPEAKERS: The mylar speaker cone with its sealed back construction provides extra durability and improved audibility. Wattage taps from 1/4 to 2 watt provide maximum on-site flexibility where



higher or lower output is desired. Connect up to #12 AWG wire using the speaker's large terminal block. The speaker's integral DC blocking capacitor permits electrical supervision of the audio distribution circuit. Models for 25 Vrms and 70 Vrms circuits are available.

STROBES: As part of the Enhanced Integrity line of products, 964/965 strobes exceed UL synchronization requirements (within 10 milliseconds other over a two-hour period) when used with a separately-installed G1M Signal Master or SIGA-CC1S Synchronization Module. They are fully compatible with Genesis signals.

Synchronization is important because a small portion of the population have a condition which may cause them to become disoriented from multiple random flashes of light. Integrity strobes minimize this risk.

Strobes are shipped with standard ceiling mount style "FIRE" lens markings. Where wall orientation, other languages, or different lens markings are required, EST offers optional LKW and LKC series Lens Marking Kits. These optional lens markings simply snap on to the strobe. Consult EST for availability of special lens markings.

Integrity strobes are designed for 20 to 31 Vdc operation and must be connected to signal circuits that output a constant (not pulsed) voltage. A diode is used to allow full signal circuit supervision.

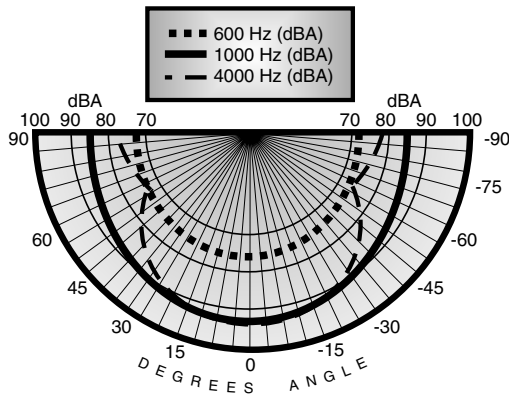
Audible Signal Application

The suggested sound pressure level for each signaling zone used with alert or alarm signals is a minimum of 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater. This is measured 5 feet (1.5 m) above the floor. The average ambient sound level is the RMS, A-weighted sound pressure measured over a 24-hour period.

Doubling the distance from the signal to the ear will theoretically cause a 6dB reduction in the received sound pressure level. The actual effect depends on the acoustic properties of materials in the space. Doubling the power output of a device (e.g.: a speaker from 1W to 2W) will increase the sound pressure level by 3dBA. A 3dBA difference represents a barely noticeable change in volume.

Typical Sound Output Distribution

dBA measured at 10 ft (3.05 m) in anechoic chamber



964/965 Series Cone Speaker

Strobe Application

These guidelines are based on ANSI/NFPA 72 National Fire Alarm Code (1993). When applied and installed in accordance with that code, EST strobes meet or exceed the illumination produced by the ADA-specified 75 candela (cd) strobe at 50 ft. However, optimum performance is obtained by providing "Equivalent Facilitation" as allowed by the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Contact EST for exact spacing requirements.

Non-Sleeping Rooms and Corridors: EST strobes rated at less than 110 cd per UL1971 are intended for use in non-sleeping areas only. Install them 80 inches (2.03 m) above floor level or within the space between six inches (150 mm) to 24 inches (610 mm) below the ceiling, whichever is lower. No point in any space (including corridors) required to have strobes shall be more than 50 ft (15.2 m) from the signal (in the horizontal plane). The 110 cd strobe should be used in non-sleeping areas only when the room exceeds 40 ft x 40 ft (12.2 m x 12.2 m). In large rooms or spaces (such as auditoriums) that exceed 100 ft (30.4 m) across and without obstructions more than 72 inches (1.8 m) above the finished floor, strobes may be placed around the perimeter, spaced a maximum of 100 ft (30.4 m) apart, in lieu of suspending them from the ceiling.

Non-Sleeping Rooms	Use ONE Wall Mounted - EST Model:
Up to 20' x 20' (6.1 x 6.1m)	964/965-5A 15 cd and 75 cd or 964/965-7A* 15/75 cd
Up to 30' x 30' (9.1 x 9.1m)	964/965-3A 30 cd
Up to 50' x 50' (15.2 x 15.2m)	964/965-8A 110 cd
Corridors	Wall Mounted - EST Model:
Any Length x Max. 20' (6.1m) Wide	964/965-5A or 964/965-7A spaced @ 100' (30.5 m) never exceeding 15' (4.5 m) from end wall

* Model 964/965-7A is rated at 15 cd (wall or ceiling mount) per UL 1971 and 75 cd per UL 1638.

Sleeping Rooms: EST model 964/965-8A is rated at 110 cd. It is intended for use in sleeping rooms and should be installed along with a smoke detector. It must be wall mounted at least 80 inches (2.03 m) above floor level, but no closer than 24 inches (610 mm) to the ceiling. The distance from the strobe to the pillow must not exceed 16 ft (4.8 m).

Sleeping Rooms	Use ONE Wall Mounted - EST Model:
Any Size	964/965-8A 110 cd

Application Notes - USA

Audible signals should never have a sound level less than 75 dBA at 10' (3 m) per NFPA 72. Signals cannot exceed 120 dBA per ADA (130 dBA per NFPA 72) at the minimum hearing distance to audible appliance. Audible signals shall be installed with the top of the device above the floor not less than 90" (2.3 m) and below the finished ceiling at least 6" (150 mm) (per NFPA 72).

Strobes must be used to supplement audible signals wherever the average ambient sound level exceeds 105 dBA. Combination Audible/Visible signals must be installed per NFPA guidelines established for strobes.

ADA suggests that the following areas may require Visual Alarm Signals:

- rest rooms, meeting rooms, and other general usage areas.
- lobbies, hallways, and other common use areas.
- sleeping rooms intended for use by persons with hearing impairment (per Title 1 of ADA).
- work areas used by a person with a hearing impairment (per Title 1 of ADA).

Application Notes - CANADA

(Based in part on 1995 Canada National Building Code)

The fire alarm signal sound pressure level shall not exceed 110 dBA in any normally occupied area. The sound pressure level from an audible signal in a floor area used for occupancies other than residential occupancies shall be not less than 10 dBA above the ambient noise, and never less than 65 dBA. The sound pressure level in sleeping rooms from an audible signal shall not be less than 75 dBA when any intervening doors between the device and the sleeping room are closed. Audible signal devices shall be installed not less than 1.8 m to the center of the device above the floor (per CAN/ULC S524).

The fire alarm audible signal shall be supplemented by fire alarm strobes in any floor area where the ambient noise level exceeds 87 dBA, or where the occupants of the floor area use ear protective devices, are located within an audiometric booth, or are located within sound insulating enclosures. This also applies to assembly occupancies in which music and other sounds associated with performances could exceed 100 dBA.

Strobes shall be installed in a building so that the flash from not less than one device is visible throughout the floor area or portion thereof in which they are installed. For maximum safety, EST recommends that strobes be installed as per the guidelines shown here under Strobe Application.

For detailed spacing requirements, consult *The Handbook of Visible Notification Appliances for Fire Alarm Applications* published by EST Press, or contact your local EST representative.



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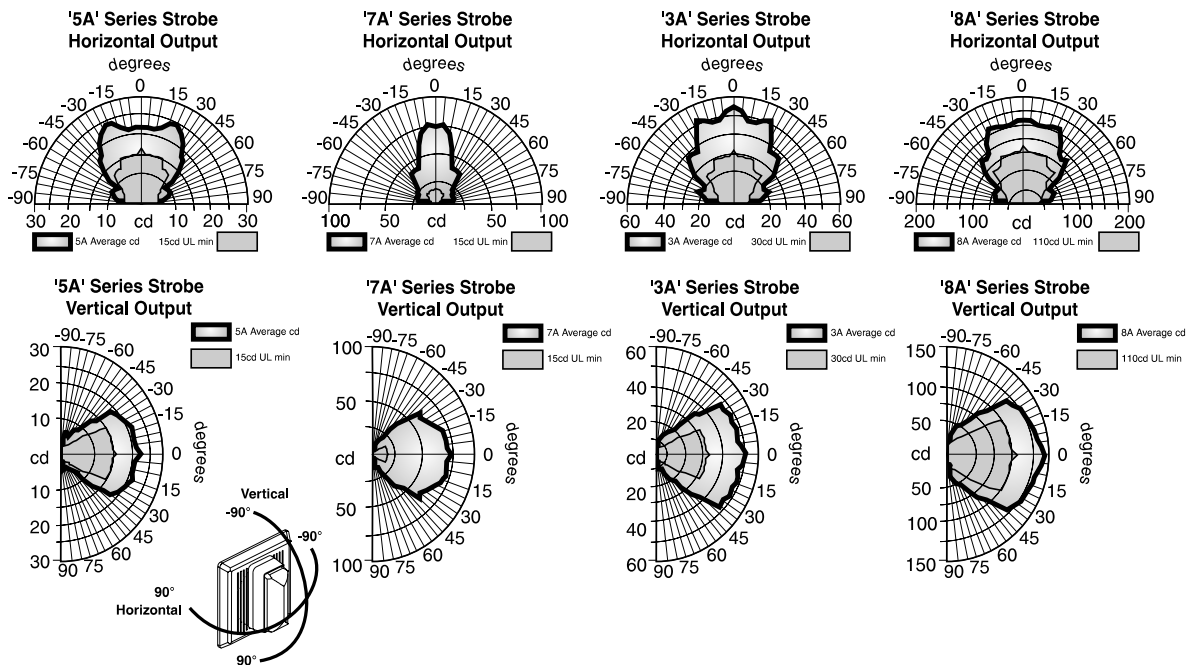
Specifications

Input/Operating Volts	Speaker: 25 Vrms (964 Series) or 70 Vrms (965 Series) - see ordering table Strobe: 20-24 Vdc Continuous			
Output: Speaker/Strobe (UL reverberant – note 1)	Speaker taps: 2W = 84 dBA, 1W = 81 dBA, 1/2W = 78 dBA, 1/4W = 75 dBA			
Output: Speaker (UL reverberant – note 1)	Speaker taps: 2W = 87 dBA, 1W = 84 dBA, 1/2W = 81 dBA, 1/4W = 78 dBA			
Output: Speaker/Strobe (UL anechoic – note 2)	Speaker taps: 2W = 90 dBA, 1W = 88 dBA, 1/2W = 85 dBA, 1/4W = 82 dBA			
Output: Speaker (UL anechoic – note 2)	Speaker taps: 2W = 95 dBA, 1W = 93 dBA, 1/2W = 90 dBA, 1/4W = 88 dBA			
Speaker Cone	Speaker frequency response: 250 to 13,000 Hz; 4-inch (102mm) mylar cone, sealed back construction, rated for 8 watts, 8 ohm voice coil.			
Strobe Flash Synchronization Characteristics	Synchronized at one flash per second. External control module necessary to meet UL 1971 synchronization requirements of 10 milliseconds over a two-hour period			
Compatible Synchronization Modules	G1M, G1M-RM, SIGA-CC1S, SIGA-MCC1S			
Rated Strobe Output - candela (cd)	964/965-5A-*	964/965-7A-*	964/965-3A-*	964/965-8A-*
UL 1971 Rated Strobe Output - candela (cd)	15cd (wall only)	15cd (wall or ceiling)	30cd (wall) 15cd (ceiling)	110cd (wall) 60cd (ceiling)
UL 1638/ULC S526 Rated Strobe Output	15cd	75cd	30cd	110cd
Mean Operating Current (note 3)	70 mA @ 24 Vdc 83 mA @ 20 Vdc	96 mA @ 24 Vdc 115 mA @ 20 Vdc	89 mA @ 24 Vdc 107 mA @ 20 Vdc	197 mA @ 24 Vdc 241 mA @ 20 Vdc
Peak Operating Current (note 3)	156 mA @ 24 Vdc	204 mA @ 24 Vdc	189 mA @ 24 Vdc	338 mA @ 24 Vdc
Mean Operating Current (note 4)	58 mA @ 24 Vdc 69 mA @ 20 Vdc	79 mA @ 24 Vdc 97 mA @ 20 Vdc	75 mA @ 24 Vdc 91 mA @ 20 Vdc	338 mA @ 24 Vdc 202 mA @ 20 Vdc
Peak Operating Current (note 4)	356 mA @ 24 Vdc	446 mA @ 24 Vdc	402 mA @ 24 Vdc	788 mA @ 24 Vdc
Strobe Lens Marking	Supplied with LKC-1 "FIRE" red letters, horizontal both sides (Ceiling Mount) - see LKW and LKC series for wall mount style and optional markings			
Flash Tube Enclosure	Clear LEXAN with white marking sleeve			
Speaker Cone	4" (102 mm) mylar cone, sealed construction, rated for 8 watts, 8 ohm voice coil			
Baffle*	Steel, baked epoxy polyester powder-coat finish			
Wire Connections	Terminals: separate, polarized inputs for speaker & strobe, #12AWG (2.5mm ²) maximum			
INDOOR Operating Environment	85% @ 30° C relative humidity; 32-120° F (0-49° C) ambient temperature			
Mounting - INDOOR	Flush: EST 960A-4RF Round Flush Box Alternate Flush Mount: North-American 4" square box, with 2-1/8" (54 mm) extension ring			
Agency Listings	UL 1971, UL 1638, UL 1480, ULC S526, ULC S541, CE Compliant, FM, CSFM, MEA (All models comply with ADA Code of Federal Regulation Chapter 28 Part 36 Final Rule)			

*-4RW Models are White; -4RR Models are Red.

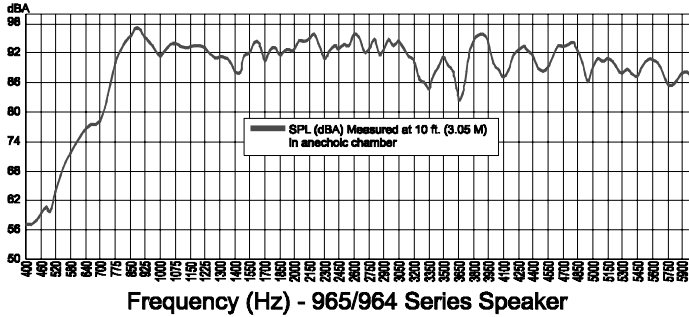
Note 1 - Measured at 10 ft (3.05 m) in reverberant room, per UL 1480. **Note 2** - Measured at 10 ft (3.05 m) in anechoic room, 1000 Hz tone. **Note 3** - Connected to FILTERED dc source. **Note 4** - Connected to UNFILTERED (Full Wave Rectified) dc source. **Note 5** - Use the mean current rating to establish the maximum number of strobes, wire gauge and standby power requirements.

Light Output Patterns



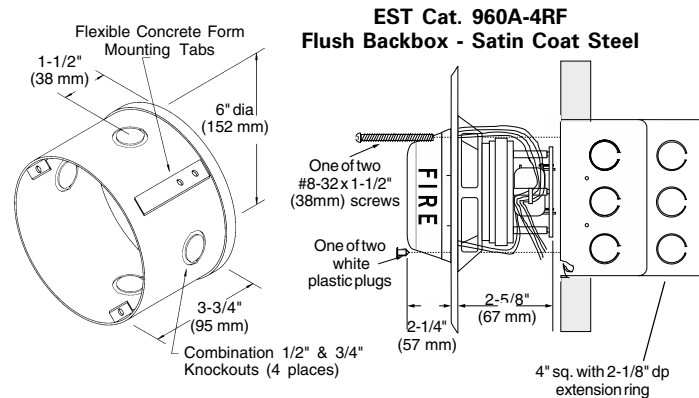
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Frequency Response/dBA Output



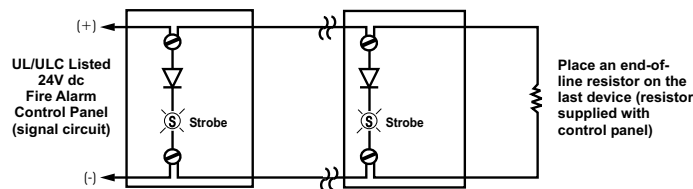
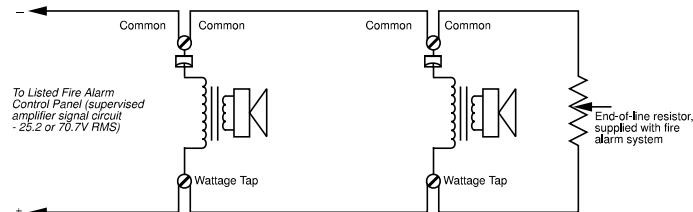
Installation and Mounting

EST recommends mounting to 960A Series boxes. All models also fit to a standard flush mount, North-American four-inch square electrical box with 2-1/8 inch (54 mm) extension ring. EST recommends that fire alarm speakers and speaker/strobes always be installed in accordance with the latest recognized edition of national and local fire alarm codes.



Typical Wiring

Connect 964 Series speakers to 25 Vrms audio circuits. Connect 965 Series speakers to 70 Vrms audio circuits. The strobe must be connected to signal circuits which output a constant (not pulsed) 24 Vdc voltage.



Ordering Information

Catalog Number	Description	Ship Wt. lb. (kg)
25 Volt SPEAKERS		
964-1A-4RR	Speaker, Red	3 (1.3)
964-1A-4RW	Speaker, White	
25 Volt Speaker/Strobes		
964-5A-4RR	Speaker-Strobe, 15cd, Red	3.3 (1.5)
964-5A-4RW	Speaker-Strobe, 15cd, White	
964-7A-4RR	Speaker-Strobe, 15/75cd, Red	
964-7A-4RW	Speaker-Strobe, 15/75cd, White	
964-3A-4RR	Speaker-Strobe, 30cd, Red	
964-3A-4RW	Speaker-Strobe, 30cd, White	
964-8A-4RR	Speaker-Strobe, 110cd, Red	
964-8A-4RW	Speaker-Strobe, 110cd, White	
70 Volt Speaker		
965-1A-4RR	Speaker, Red	3 (1.3)
965-1A-4RW	Speaker, White	
70 Volt Speaker/Strobes		
965-5A-4RR	Speaker-Strobe, 15cd, Red	3.3 (1.5)
965-5A-4RW	Speaker-Strobe, 15cd, White	
965-7A-4RR	Speaker-Strobe, 15/75cd, Red	
965-7A-4RW	Speaker-Strobe, 15/75cd, White	
965-3A-4RR	Speaker-Strobe, 30cd, Red	
965-3A-4RW	Speaker-Strobe, 30cd, White	
965-8A-4RR	Speaker-Strobe, 110cd, Red	
965-8A-4RW	Speaker-Strobe, 110cd, White	
Synchronization Modules		
G1M-RM	Genesis Signal Master Remote Mount (1-gang)	0.1 (0.5)
SIGA-CC1S	Synchronization Output Module (Standard Mount)	0.5 (0.23)
SIGA-MCC1S	Synchronization Output Module (UIO Mount)	0.18 (0.08)
Mounting Accessories		
960A-4RF	Round Flush Box, Indoor	1.5 (.7)
Lens Marking Kits*		
LKW-1	"FIRE", Wall Orientation	0.2 (.1)
LKW-1R	"FIRE", Red, Wall Orientation	
LKW-2	"FEU", Wall Orientation	
LKW-3	"FIRE/FEU", Wall Orientation	
LKW-4	"SMOKE", Wall Orientation	
LKW-5	"HALON", Wall Orientation	
LKW-6	"CO2", Wall Orientation	
LKW-7	"EMERGENCY", Wall Orientation	
LKW-8	"ALARM", Wall Orientation	
LKW-9	"FUEGO", Wall Orientation	

*Change "W" to "C" for Ceiling Mount (e.g. LKC-1)

WARNING: These devices will not operate without electrical power. As fires frequently cause power interruptions, we suggest you discuss further safeguards with your local fire protection specialist. These visual signal appliances' flash intensity may not be adequate to alert or waken occupants in the protected area. Research indicates that the intensity of strobe needed to awaken 90% of sleeping persons is approximately 100 cd. EST recommends that strobes in sleeping rooms be 110 cd minimum.