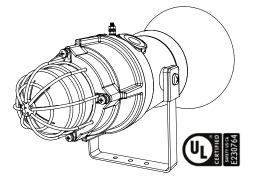


# INSTRUCTION & SERVICE MANUAL D1xC COMBINED ALARM HORNS & STROBES For Use In Hazardous Locations - Gas



The D1xC1 & D1xC2 combined alarm horns & strobes are classified by UL as Audible Signaling Appliances for General Signaling and Public Mode Fire Alarm use in Hazardous Locations

# 1) Introduction

The D1xC1 & D1xC2 range are UL Classified combined alarm horns and strobes which produce a loud warning signal in a hazardous area. Sixty-Four first stage alarm sounds can be selected by internal switches and each one can be externally changed to a second, third or fourth stage alarm sound. The alarm horn may be used for Gas applications in Class I Division 1 & 2 as well as Class I Zone 1 & 2. D1xS1 & D1xS2 alarm horns and D1xL1 & D1xL2 Loudspeakers are also available as well as variants for Explosive Dust Atmospheres.

# 2) Warnings

#### CAUTION

TO REDUCE THE RISK OF IGNITION OF HAZARDOUS ATMOSPHERES:

DISCONNECT FROM SUPPLY BEFORE OPENING. KEEP TIGHTLY CLOSED WHEN IN OPERATION. WARNING

FIT SEALING FITTING IN CONDUIT RUNS WITHIN 18 INCHES FROM ENCLOSURE.

EQUIPMENT MUST NOT BE INSTALLED WITH THE HORN FACING UPWARDS OF HORIZONTAL

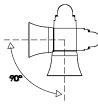
#### ATTENTION

POUR REDUIRE LE RISQUE D'INFLAMMATION DES ATMOSPHÈRES DANGEREUSES:

COUPER L'ALIMENTATION AVANT OUVERTURE. CONSERVER FERMÉ PENDANT LE FONCIONNEMENT.

<u>AVERTISSEMENT</u> CONDUITS DOIVENT ÊTRE SCELLÉS EN MOINS DE 18 POUCES.

ÉQUIPEMENT NE DOIT PAS ÊTRE INSTALLÉ AVEC LE KLAXON TOURNÉE VERS LE HAUT DE HORIZONTAL.



### 3) Ratings and Markings

The D1xC1 and D1xC2 combined alarm horns and strobes comply with the following standards for hazardous locations:

UL 1203 CSA C22.2 NO. 30-M1986

The D1xC1 and D1xC2 combined alarm horns and strobes also comply with the following standards for signaling equipment:

UL464, UL1638 CSA C22.2 NO. 205-12

# 3.1 Class / Division Ratings for US & Canada

The D1xC1X05-DC024 / D1xC1X05-AC115 combined alarm horns and strobes are rated as follows:

Class I Div 1	ABCD	T5	Ta -40°C to +70°C
Class I Div 1	ABCD	T6	Ta -40°C to +55°C

The D1xC1X05-AC230 combined alarm horns and strobes are rated as follows:

Class I Div 1 ABCD T6 Ta -40°C to +55°C

The D1xC1X10 / D1xC2X05 / D1xC2X10 combined alarmhorns and strobes are rated as follows:Class I Div 1ABCDClass I Div 1ABCDT6Ta -40°C to +55°CClass I Div 1ABCDT6Ta -40°C to +50°C

Installation must be carried out in compliance with the National Electric Code / Canadian Electric Code

# 3.2 Class / Zone ratings for US & Canada

The D1xC1X05-DC024 / D1xC1X05-AC115 combined alarmhorns and strobes are rated as follows:Class I Zone 1IICT5Ta -40°C to +70°CClass I Zone 1IICT6Ta -40°C to +55°C

The D1xC1X05-AC230 combined alarm horns and strobes are rated as follows:

Class I Zone 1 IIC T6 Ta -40°C to +55°C

Installation must be carried out in compliance with the National Electric Code / Canadian Electric Code

#### 3.3 Fire Alarm Rating

The following models are approved for use as audible signal appliances for fire alarm use – public mode and produce a sound pressure level above 75dB(A) at 10 feet:

D1xC1X05-DC024 / D1xC1X10-DC024 D1xC2X05-DC024 / D1xC2X10-DC024

For public mode fire alarm use the temporal pattern tone No. 12 as per the tone table provided in these instructions must be selected. Only units with clear lens may be used.

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		•	E 44 (0)

# 3.4 Ambient Temperature Range:

For D1xC1X05-DC024 / D1xC1X05-AC115 -40°C to +70°C (D1xC1X05-DC024 / D1xC1X05-AC115 only)

For D1xC1X05AC230 / D1xC1X10 / D1xC2X05 / D1xC2X10 -40°C to +55°C

# 3.6 Electrical Ratings per UL Listing

# **3.5 Ingress Protection Ratings**

The product is rated for ingress protection as follows: IP rating per EN60529: IP66 Type rating per UL50E / NEMA250: 4 / 4X / 3R / 13 Warning – not suitable for exposure to Acetic Acid or Reference Fuel C.

Model No.	Nom. Voltage	Nom. rms current sounder <sup>1</sup>	Nom. rms current beacon <sup>1</sup>	Nom. rms current combined <sup>1</sup>	Voltage Range	Max. rms current combined <sup>2</sup>
D1xC1X05-DC024	24Vdc	217 mA	323 mA	540 mA	20-28Vdc	604 mA @ 20Vdc
D1xC1X05-AC115	115Vac 60Hz	77 mA	130 mA	207 mA	110-120Vac 50/60Hz	266 mA @ 120Vac 60Hz
D1xC1X05-AC230	230Vac 50Hz	53 mA	79 mA	132 mA	220-240Vac 50/60Hz	151 mA @ 240Vac 60Hz
D1xC1X10-DC024	24Vdc	217 mA	673 mA	890 mA	20-28Vdc	1112 mA @ 20Vdc
D1xC1X10-AC115	115Vac 60Hz	77 mA	247 mA	324 mA	110-120Vac 50/60Hz	431 mA @ 120Vac 60Hz
D1xC1X10-AC230	230Vac 50Hz	53 mA	121 mA	174 mA	220-240Vac 50/60Hz	229 mA @ 240Vac 60Hz
D1xC2X05-DC024	24Vdc	924 mA	323 mA	1247 mA	20-28Vdc	1477 mA @ 20Vdc
D1xC2X05-AC115	115Vac 60Hz	268 mA	130 mA	398 mA	110-120Vac 50/60Hz	446 mA @ 110Vac 60Hz
D1xC2X05-AC230	230Vac 50Hz	159 mA	79 mA	238 mA	220-240Vac 50/60Hz	255 mA @ 220Vac 60Hz
D1xC2X10-DC024	24Vdc	924 mA	673 mA	1597 mA	20-28Vdc	1984 mA @ 20Vdc
D1xC2X10-AC115	115Vac 60Hz	268 mA	247 mA	515 mA	110-120Vac 50/60Hz	604 mA @ 120Vac 60Hz
D1xC2X10-AC230	230Vac 50Hz	159 mA	121 mA	280 mA	220-240Vac 50/60Hz	330 mA @ 240Vac 60Hz

1) Nom. rms current draw at nom. voltage, worst case tone and 1Hz flash rate

2) Max. rms current draw at worst case voltage, tone and flash rate

# 3.7 Surge Current for Fire Alarm use per UL Listing

Part No.	Voltage	Peak Surge Current	RMS surge Current
D1xC1X05-DC024 / D1xC2X05-DC024	28Vdc	2.54 A @ 2.06 mS	1.29 A
D1xC1X10-DC024 / D1xC2X10-DC024	28Vdc	2.96 A @ 2.06 mS	1.61 A

Surge current given at worst case voltage, tone and flash rate

# 3.8 On-Axis Flash Rate and min. Light Output for Fire Alarm use per UL Listing

Part No.	Voltage	Flash Rate	Light output in candela-effective intensity	Lens Colour
D1xC1X05-DC024 / D1xC2X05-DC024	20Vdc	1Hz / 60 fpm	12 cd eff.	Clear
D1xC1X10-DC024 / D1xC2X10-DC024	20Vdc	1Hz / 60 fpm	20 cd eff.	Clear

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#### 4) Installation

### 4.1 Safe Installation Requirements

The product must only be installed by suitably qualified personnel in accordance with the latest issues of the relevant standards.

The installation of the units must also be in accordance with the NEC / CEC and any local regulations and should only be carried out by a competent electrical engineer who has the necessary training.

The Equipment must not be installed with the horn facing upwards of horizontal.

To maintain the ingress protection rating and mode of protection, the cable entries must be fitted with suitably rated cable entry and/or blanking devices during installation. If conduit is used for installation, seal conduit within 18 inches from the enclosure.

If entries are fitted with adaptors they must be suitably rated for the application. Fitting of blanking elements into adaptors is not permitted.

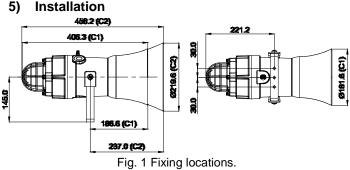
If a high IP (Ingress Protection) rating is required then a suitable sealing washer or O-ring must be fitted under any cable gland or blanking device with metric threads.

Only the explosionproof cover is to be used for access to the enclosure for installation, service and maintenance.

Connections are to be made into the terminal blocks using solid or stranded wire, sizes 0.5-4.0mm<sup>2</sup> / AWG 20-12. Wire insulation needs to be stripped 6-7mm. Wires may be fitted securely with crimped ferrules. Terminal screws need to be tightened down with a tightening torque of 0.4 Nm / 3.5 Lb-in.

Earthing connections should be made to the Internal Earth terminal in the explosionproof chamber or the external earth stud.

Check that the 'O' ring seal is in place before replacing the explosion proof cover.



#### 5.1 Mounting

The D1x Alarm Horn may be secured to any flat surface using the three 7mm fixing holes. The enclosure provides IP66 protection and is suitable for installation in exterior locations providing it is positioned so that water cannot collect in the horn, and the cable entry is sealed.

### 5.2 Installation procedure

- a. Secure the D1x alarm horn to a flat surface via the three 7mm fixing holes in the mounting bracket.
- b. Remove the explosionproof cover of the alarm horn by unscrewing it, taking care not to damage the explosionproof threads in the process (Refer to section 6).
- c. Fit an M20/NPT suitably rated cable gland or conduit entry into the hole in the enclosure and connect the field wiring to the appropriate alarm horn terminals as shown in fig. 6 (AC) or fig 8. (DC). The power supply terminals are duplicated so that units may be connected in parallel. An end of line monitoring resistor may be fitted to DC units only (see section 14). If the second and third M20/NPT entries are not used, suitably rated stopping plugs must always be fitted.
- d. Replace the explosionproof cover of the loudspeaker, taking care not to damage the explosionproof threads. Tighten fully.

#### **5.3 Hornless Variants**

The D1x Sounder is also available as a variant with no horn fitted in the factory. The Horn threaded nose portion has a fitment thread of 1-3/8" - 18 UNF (to BS1580 or ANSI B1.1). The customer is responsible for sourcing and correctly fitting a suitable horn that meets all of the relevant safety requirements.

# 6) Access to Explosionproof Enclosure

In order to connect the electrical supply cables to the alarm horn it is necessary to remove the explosionproof cover to gain access to the explosionproof chamber. This can be achieved by unscrewing the explosionproof cover, taking extreme care not to damage the explosionproof threads in the process.

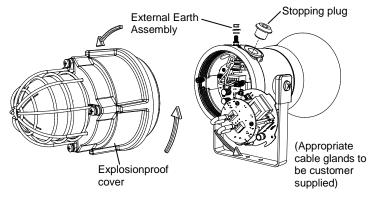
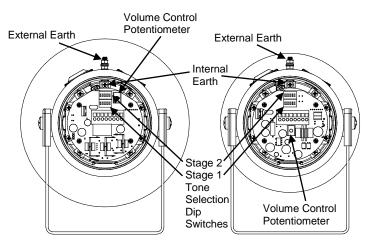


Fig. 2 Accessing the Explosionproof Enclosure.

On completion of the cable wiring installation the explosionproof threads should be inspected to ensure that they are clean and that they have not been damaged during installation. Also check that the 'O' ring seal is in place, on the thread diameter in contact with the flat face of the explosionproof cover. When replacing the explosionproof cover ensure that it is tightened fully.

#### Volume Control 7)

The output level of the D1x alarm horn can be set by adjusting the volume control potentiometer (see Fig 3). For maximum output, set the potentiometer fully clockwise.



# D1xC2AC / D1xC2DC / D1xC1DC / D1xC1AC

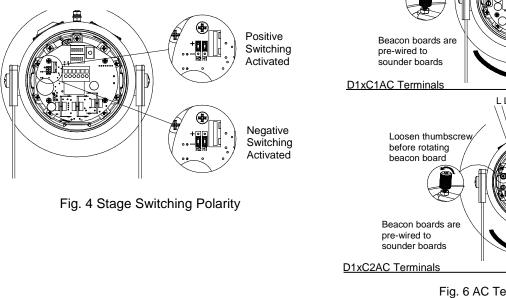
Fig. 3 Location of field controls

#### **Tone Selection** 8)

The D1xC1 & D1xC2 units have 64 different tones that can be selected independently for the first and second stage alarms. The tones are selected by operation of the tone setting DIP switches 1 & 2 (see Fig. 3) on the PCB. The alarm horns can also be switched to sound the third and fourth stage alarm tones. The tone table (Table 1) shows the switch positions for the 64 tones on first and second stages and which tones are available for the third and fourth stages dependent on the Stage 1 DIP switch setting.

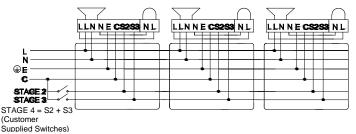
#### 9) Stage Switching Polarity (DC Units Only)

The D1xC2 and D1xC1 DC alarm horns have the facility to use either +ve or -ve switching to change the tone to the second, third and fourth stages. For -ve switching connect the two headers on the pcb to the left-hand (marked -ve) and centre pins. For +ve switching connect the headers to the right hand (marked +ve) and the centre pins. (Refer to Fig. 4)

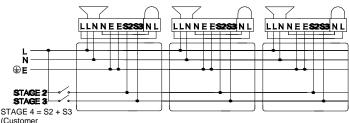


# 10) AC Wiring

# 10.1 Wiring Diagrams







Supplied Switches



# 10.2 Units First Stage Tones

Stage one (S1) operation: Simply connect the supply voltage to the L and N supply terminals, (see fig. 6).

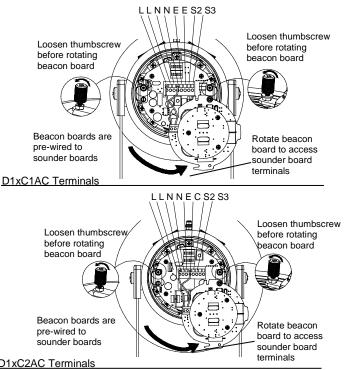
# 10.3 AC Units Second, Third and Fourth Stage Tone Selection

To select the second, third and fourth stage tones on the D1x AC alarm horns.

Stage two (S2) operation : Power L and N, link the common (C) and S2 terminal.

Stage three (S3) operation : Power L and N, link the common (C) and S3 terminals.

Stage four (S4) operation : Power L and N, link the common (C) and both the S2 and S3 terminals.



# Fig. 6 AC Terminals

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# 11) DC Wiring

# **11.1 Wiring Diagrams**

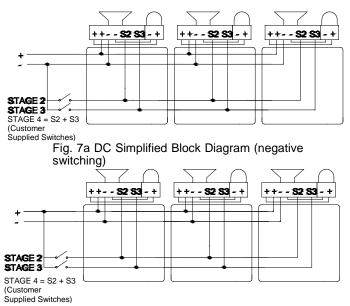


Fig. 7b DC Simplified Block Diagram (positive switching

#### 11.2 Units First Stage Tones

Stage one (S1) operation: Simply connect the supply voltage to the + and - supply terminals, (see fig. 8).

### 11.3 DC Units Second, Third and Fourth Stage Tone Selection

For units set up for -ve switching (default setting):

Stage two (S2) operation : Power +ve and -ve, link a -ve supply line to the S2 terminal. Dip switch 2 alters stage 2 tone. Stage three (S3) operation : Power +ve and -ve, link a -ve supply line to the S3 terminal. Dip switch 1 alters stage 3 tone. Stage four (S4) operation : Power +ve and -ve, link a -ve supply line to both the S2 & S3 terminals. Dip switch 1 alters stage 4 tone.

For units set up for +ve switching (refer to 9.1):

Stage two (S2) operation : Power +ve and -ve, link a +ve supply line to the S2 terminal. Dip switch 2 alters stage 2 tone. Stage three (S3) operation : Power +ve and -ve, link a +ve supply line to the S3 terminal. Dip switch 1 alters stage 3 tone. Stage four (S4) operation : Power +ve and -ve, link a +ve supply line to both the S2 & S3 terminals. Dip switch 1 alters stage 4 tone.

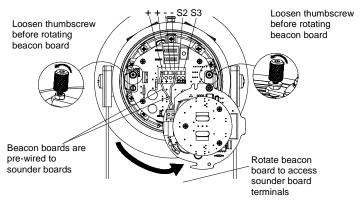


Fig. 8 DC Terminals

# 12) Earthing

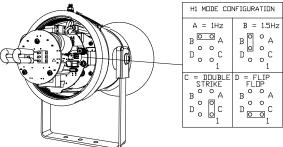
The unit has both a primary internal and secondary external earth fixing point.

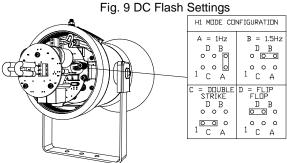
Internal earth connections should be made to the internal Earth terminal (see Fig. 3 and 4. It should be fitted to the internal earth point using a ring crimp terminal to secure the earth conductor.

In addition, external earth connections can be made to the M5 earth stud (see Fig. 2), using a ring crimp terminal to secure the earth conductor to the earth stud. The external earth crimp ring should be located between the two M5 plain washers provided and securely locked down with the M5 spring washer and M5 nut.

The earth conductor should be at least equal in size and rating to the incoming power conductors but at least a minimum of 0.82mm<sup>2</sup> / 18AWG in size.

### 13) Flash Rate Settings





(Flip-Flop Mode not available on D1xC1X05 / D1xC2X05)

Fig. 10 AC Flash Settings

# 14) End Of Line Monitoring (DC Units Only)

On D1xC1DC & D1xC2DC units, dc reverse line monitoring can be used if required. All DC alarm horns have a blocking diode fitted in their supply input lines. An end of line monitoring diode or an end of line monitoring resistor can be connected across the +ve and -ve terminals. If an end of line resistor is used it must have a minimum resistance value of 3k3 ohms and a minimum power rating of 0.5 watts or a minimum resistance value of 500 ohms and a min. power rating of 2 watts.

The resistor must be connected directly across the +ve and ve terminals as shown in the following drawing. The resistor leads should be kept as short as possible. End Of Line Resistor

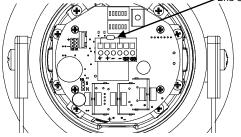


Fig. 11 End Of Line Resistor

table also sl	hows the second stage tone can b	first stage tone set the tone Set DIP switch 1 (6 way DIP see Fig 3) to e set independently with the Stage 2 DIP switch to select the required / are set/linked via the first stage tone selection.				
Stage 1 Set DIP Switch 1 Tone No	Tone Description	Tone Visual	Stage 1 & 2 DIP Switch Settings 1 2 3 4 5 6	Stage 2 Set DIP Switch 2 Tone (S2)	Stage 3 Set DIP Switch 1 Tone (S3)	Stage 4 Set DIP Switch 1 Tone (S2 + S3)
1	1000Hz PFEER Toxic Gas	1000Hz	000000	1	2	44
2	1200/500Hz @ 1Hz DIN / PFEER P.T.A.P.	1200Hz 1s 500Hz 1s	100000	2	3	44
3	1000Hz @ 0.5Hz(1s on, 1s off) PFEER Gen. Alarm	1000Hz 1s	010000	3	2	44
4	1.4KHz-1.6KHz 1s, 1.6KHz- 1.4KHz 0.5s NF C 48-265	1600Hz 0.5s 1400Hz 1s	110000	4	24	1
5	544Hz(100mS)/440Hz (400mS) NF S 32-001	544Hz 0.1s 440Hz 0.4s	001000	5	19	1
6	1500/500Hz - (0.5s on , 0.5s off) x3 + 1s gap AS4428	1500Hz 500Hz 0.5s 0.5s 0.5s 0.5s 1.5s	101000	6	44	1
7	500-1500Hz Sweeping 2 sec on 1 sec off AS4428	1500Hz 500Hz 2s 1s	011000	7	44	1
8	500/1200Hz @ 0.26Hz(3.3s on, 0.5s off) Netherlands - NEN 2575	1200Hz 500Hz	111000	8	24	35
9	1000Hz (1s on, 1s off)x7 + (7s on, 1s off) IMO Code 1a	1000Hz 1s 1s 1s 1s 1s 7s	000100	9	34	1
10	1000Hz (1s on, 1s off)x7 + (7s on, 1s off) IMO Code 1a	1s   1s   1s   1s   1s   1s   1s    7s	100100	10	34	1
11	420Hz(0.5s on, 0.5s off)x3 + 1s gap ISO 8201 Temporal Pattern	420Hz 0.5s 0.5s 0.5s 1.5s	010100	11	1	8
12	1000Hz(0.5s on, 0.5s off)x3 + 1s gap ISO 8201 Temporal Pattern	1000Hz 0.5s 0.5s 0.5s 1.5s	110100	12	1	8
13	422/775Hz - (0.85 on, 0.5 off) x3 + 1s gap NFPA - Temporal Coded	775Hz 422Hz 0.85s 0.5s 0.85s 0.5s 1.5s	001100	13	1	8
14	1000/2000Hz @ 1Hz Singapore	2000Hz 1000Hz 1s	101100	14	3	35
15	300Hz Continuous	300Hz	011100	15	24	35
16	440Hz Continuous	440Hz	111100	16	24	35
17	470Hz Continuous	470Hz	000010	17	24	35
18	500Hz Continuous IMO code 2 (Low)	500Hz	100010	18	24	35
19	554Hz Continuous	554Hz	010010	19	24	35
20	660Hz Continuous	660Hz	110010	20	24	35
21	800Hz IMO code 2 (High)	800Hz	001010	21	24	35
22	1200Hz Continuous	1200Hz	101010	22	24	35
23	2000Hz Continuous	2000Hz	011010	23	3	35
24	2400Hz Continuous	2400Hz	111010	24	20	35
25	440 @0.83Hz (50 cycles/minute) Intermittent	440Hz 0.6s 0.6s	000110	25	44	8
26	470 @0.9Hz - 1.1s Intermittent	470Hz 0.55s 0.55s	100110	26	44	8
27	470Hz @5Hz - (5 cycles/second) Intermittent	470Hz 0.1s 0.1s	010110	27	44	8
28	544Hz @ 1.14Hz - 0.875s Intermittent	470Hz 0.43s 0.44s	110110	28	24	8
29	655Hz @ 0.875Hz Intermittent	655Hz 0.57s 0.57s	001110	29	44	8
30	660Hz @0.28Hz - 1.8sec on, 1.8sec off Intermittent	660Hz 1.8s 1.8s	101110	30	24	8
31	660Hz @3.34Hz - 150mS on, 150mS off Intermittent	660Hz 0.15s 0.15s	011110	31	24	8

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r	1		I			
32	745Hz @ 1Hz Intermittent	745Hz 0.5s 0.5s	111110	32	24	8
33	800Hz - 0.25sec on, 1 sec off Intermittent	800Hz 0.25s 1s	000001	33	24	8
34	800Hz @ 2Hz IMO code 3.a (High) Intermittent	800Hz 0.25s 0.25s	100001	34	24	8
35	1000Hz @ 1Hz Intermittent	1000Hz 0.5s 0.5s	010001	35	24	8
36		2400Hz 0.5s	110001	36	24	8
37	2400Hz @ 1Hz Intermittent	2900Hz 0.1s	001001	37		8
	2900Hz @ 5Hz Intermittent	518Hz 0.5s	101001		24	
38	363/518Hz @ 1Hz Alternating	363Hz <u>0.5s</u> 500Hz 0.25s	011001	38	8	19
39	450/500Hz @ 2Hz Alternating	450Hz 0.258 554Hz 0.5s	111001	39	8	19
40	554/440Hz @ 1Hz Alternating 554/440Hz @ 0.625Hz	440Hz <u>0.5s</u> 554Hz <u>0.8s</u>		40	24	19
41	Alternating	440Hz 0.8s	000101	41	8	19
42	561/760Hz @0.83Hz (50 cycles/minute) Alternating	561Hz 0.6s	100101	42	8	19
43	780/600Hz @ 0.96Hz Alternating	600Hz 0.52s	010101	43	8	19
44	800/1000Hz @ 2Hz Alternating	800Hz 0.25s	110101	44	24	19
45	970/800Hz @ 2Hz Alternating	970Hz 0.25s 0.25s 0.25s	001101	45	8	19
46	800/1000Hz @ 0.875Hz Alternating	1000Hz 0.57s 800Hz 0.57s	101101	46	24	19
47	2400/2900Hz @ 2Hz Alternating	2900Hz 0.25s 2400Hz 0.25s	011101	47	24	19
48	500/1200Hz @ 0.3Hz Sweeping	1200Hz 500Hz 3.34s	111101	48	24	12
49	560/1055Hz @ 0.18Hz Sweeping	1055Hz 560Hz 5.47s	000011	49	24	12
50	560/1055Hz @ 3.3Hz	1055Hz	100011	50	24	12
51	Sweeping 600/1250Hz @ 0.125Hz	1250Hz	010011	51	24	12
	Sweeping 660/1200Hz @ 1Hz	600Hz 8s 1200Hz				
52	Sweeping	660Hz 1s 1000Hz	110011	52	24	12
53	800/1000Hz @ 1Hz Sweeping	800Hz 1s 1000Hz	001011	53	24	12
54	800/1000Hz @ 7Hz Sweeping 800/1000Hz @ 50Hz	800Hz 0.14s	101011	54	24	12
55	Sweeping	800Hz 0.02s 2900Hz	011011	55	24	12
56	2400/2900Hz @ 7Hz Sweeping	2400Hz 0.14s	111011	56	24	12
57	2400/2900Hz @ 1Hz Sweeping	2400Hz 1s 2900Hz	000111	57	24	12
58	2400/2900Hz @ 50Hz Sweeping	2400Hz 0.02s	100111	58	24	12
59	2500/3000Hz @ 2Hz Sweeping	3000Hz 2500Hz 0.5s	010111	59	24	12
60	2500/3000Hz @ 7.7Hz Sweeping	3000Hz 2500Hz 0.13s	110111	60	24	12
61	800Hz Motor Siren	800Hz	001111	61	24	12
62	1200Hz Motor Siren	1200Hz2s	101111	62	24	12
63	2400Hz Motor Siren	2400Hz	011111	63	24	12
64	Simulated Bell	1450Hz 0.25s	111111	64	21	12
		←0.69ms→		<b>U</b> 1	- ·	

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