

# *ZX-1004*

# **Caller ID**

# **Simulator**

**Technical Manual**  
for  
ZX-1004 Caller ID Simulator

**For Processor Versions covering  
all International Caller ID Formats**



# ZX-1004

## Caller ID/Telephone Simulator

(Version 1.0 10/20/2006)

### Description

The ZX-1004 device simulates an active telephone line. A telephone connected to one line can call a telephone device on the second line. The second phone will ring and receive Caller ID. If the second line is answered, a normal conversation can be conducted between the two telephones. The ZX-1004 is programmable for various situations and operating modes through the telephone keypad or external host computer. It can simulate the different ring types and virtually all Caller ID formats found throughout the world.

### Features

- Phone calls initiated to output phone line by three different methods.
- Complete control over what Caller ID information is delivered and in which Caller ID signaling format is sent.
- For equipment testing, calls can be initiated via RS232 connection.
- Distinctive Ring signals simulated.
- US, ETSI, British Telecom, and DTMF formats simulated.
- Six dialing sequences stored in non-volatile memory.
- Each sequence can be individually programmed Caller ID information sent, Caller ID signaling type, and ringing type.
- All programming can be done via RS232 interface or telephone key-pad.
- All default settings easily restored.
- Provides true dial tone, ring, and line voltage.

### Default Operation

Default settings contained within the ZX-1004 enable immediate usage of the device. Plug in the power supply. Connect a telephone to the jack marked "phone". The manual will refer this telephone as the *primary* telephone. Connect a telephone device and/or another telephone to the jack marked "Device". This will be referred to as the *secondary* device or phone. From the primary telephone, pick up the receiver and dial any digit. A phone call to the secondary telephone line will be initiated. A standard ring will be generated along with a US type Caller ID signal containing the default Caller ID information contained within the device's memory. When the secondary device or telephone is answered a normal phone connection is established.

### Custom Operation

The ZX-1004 offers two basic types of custom operation, Dial Method and Dialed Sequence settings.

The unit contains 6 different dialing sequences. The information contained within each sequence defines the Caller ID information that will be delivered, the type of Caller ID signaling that will be sent, and the type of ring that will be generated. The user can modify all data in each sequence.

The particular dialing sequence number that will be sent is defined by either a RS232 command using a serial port connection, or from the dialed digits on the primary phone in combination with the dial method set. For example, when the unit is set for "One Digit Dialing", and you want to send sequence number 2, you would simply pick up the receiver and dial "2".

## Dial Method

You can define how the unit initiates a call. Three options are available; "One Digit" dialing, "Multi-Digit" dialing (normal phone dialing), or dial "Upon Pickup" (when phone goes off-hook after 3 seconds). The dialing sequence sent by each of these dialing methods is defined below.

Method #	Dial Method Description	Dialing Sequence Sent is defined by
1	<i>One Digit</i> dialing	The first digit dialed
2	<i>Multi-Digit</i> dialing	The last digit of phone number dialed
3	<i>Dial Upon Pickup</i>	First sequence is sent*

\* Note that if a digit or digits are dialed before the sequence is sent, the sequence sent will match the last digit dialed.

## Dialing Sequence Definitions

Six different dialing sequences are contained within the unit's non-volatile memory. Each sequence defines the Caller ID signaling type, ring type generated, and the Caller ID information sent (Date/Time, Number, and Name). Only 2 or 3 sequences are generally used in simple demonstrations, but all 6 might be used when testing devices or software interfaces. All information in each sequence can be modified via RS232 interface or with a touch-tone phone. The default dialing sequences are show in the table below (CID = Caller ID):

Seq. #	CID Number	CID Name	Date/Time	CID Signal*	Ring Type*
1	9987654321	John Smith	06070809	1	1
2	3214567890	ABC Inc.	06070809	1	1
3	8901234567	Susan Jones	06070809	1	1
4	8002404637	CallerID.com	06070809	1	1
5	7702637111	CallerID.com	06070809	1	1
6	7702630049	CallerID Fax	06070809	1	1

## Dial Methods and Dialing Sequence Delivery Examples

### A. Unit is set to the default Dial Method #1 – One Digit Dialing

The user picks up the primary phone and dials 3. The unit sends sequence #3 (8901234567, Susan Jones)

### B. Unit is set to Dial Method #2 – Multi-Digit dialing

The user picks up the phone and dials 770-263-7111. Three seconds after the last digit is dialed (digit 1), sequence #1 is sent (9987654321, John Smith).

### C. Unit is set to Dial Method #3 – dial Upon Pickup

The first sequence is delivered three seconds after the phone is picked up (unless a digit is dialed before 3 seconds)

**Note:** If the dialed digit does not match one of the sequences above (i.e. 7,8,9 or 0), the unit will send sequence #1.

## Programming the Unit from a Host Computer

Programming ZX-1004 from a host computer is accomplished using a 9 pin, straight-wired, serial cable and host terminal program. A suitable terminal program, called HyperTerminal, is supplied with virtually every Microsoft Windows platform. Configure your terminal program to the COM port number in which the unit is connected and use the following parameters:

*Bits per Second = 9600 Data Bits = 8 Parity = None Stop Bits = 1 Flow Control = None.*

For specific instructions on how to connect to the unit using HyperTerminal in Windows, please refer to Appendix B. Once connected in your terminal program, type a capital "V" on the host computer. The unit will return:

**V=n.n M=One Digit** (where "n.n" is the version of the microprocessor software and "M=xxx..." is the Dial Method)

If you do not see the above response by the unit after typing capital "V", then you are not connected to the unit.

## RS232 Commands

Once connected in your terminal program, type "?". The unit will respond with the following:

```
RS232 Commands:
U=List Sequences
I=Edit Sequences
V=Show Version/Dial Method
M=Edit Dial Method
@=Reset to Defaults
1-6 Invoke Dialing
?=Help
```

Each of these commands will be explained in the following sections.

### U Command (List Sequences)

To see what data presently resides in the dialing sequences, use the capital "U" command. The default sequences are show below:

```
# F R Date      Number      Name
=====
1 1 1 06070809 9987654321  John Smith
2 1 1 06070809 3214567890  ABC Inc.
3 1 1 06070809 8901234567  Susan Jones
4 1 1 06070809 8002404637  CallerID.com
5 1 1 06070809 7702637111  CallerID.com
6 1 1 06070809 7702630049  CallerID Fax
```

#### Definitions

# ..... Sequence Number (1-6)  
F ..... Caller ID Signaling Format (1-7)  
R ..... Ring Type "Distinctive Ring" (1-4)  
Date ..... Caller ID date sent, Format = "MMDDhhmm" (2 digit Month, 2 digit Day, 2 digit hour, 2 digit minute)  
Number.. Caller ID number sent (up to 12 digits)  
Name ..... Caller ID name sent (letters and numbers, up to 15 characters)

### I Command (Edit Sequences)

For custom data delivery, you need to edit the data in the dialing sequences. Simply type "I", and the unit will respond with:

```
Sequence#(1-6)?
```

Type the number of the sequence you would like to change. The unit will respond similar to below:

```
#=9987654321
N=John Smith
D=06070809
F=1
R=1
Edit(#NDFR or QW)
```

Type the corresponding character of the field you wish to change. For example, if you type "#" to the unit will respond with:

```
Number (1-12 Digits)
```

Simply type the phone number that you would like stored and hit **Enter (<C/R>)** Change any other fields you would like in the same fashion. When finished changing the sequence make sure to type "W", to write your selection to memory.

#### **Note 1 - Write Changes to Memory**

Make sure to type "W" to write changes to memory. If you type "Q", this will exit the programming mode without your changes being saved.

#### **Note 2 - Time Out**

When in the programming mode, if no keyboard entry is detected within 45 seconds, the unit will exit from the programming mode. It will "time out" and print "T/O" on the screen.

### Note 3 - Private & Out-of-Area records

In order to instruct the unit to send out an "Out-of-Area" message as the phone number, enter the single number "2" in the phone number field. A "Private" message will be sent as the phone number when a single "3" is entered into the phone number field.

To send an "Out-of-Area" Caller ID name, simply enter an "O" in the name field. A single "P" will send out "Private" as the Caller ID name.

### V Command (Show Version/Dial Method)

This command displays the version number of the microprocessor software and the Dial Method being used. To change the Dial Method, use the M command.

### M Command (Change Dial Method)

There are three types of dial methods available as show below. The default is number one, single digit dialing.

- #1 = *One Digit* dialing – user picks up the primary phone and dials a number. The dialing sequence that matches the number dialed is sent to the secondary line.
- #2 = *Multi-Digit* dialing – user picks up the primary phone and dials a phone number of any length. Three seconds after the last digit is dialed, the dialing sequence that matches the last number will be sent.
- #3 = *dial Upon Pickup* – User simply picks up the phone and after three seconds, the unit sends the dialing sequence #1.

### @ Command (Reset to Defaults)

Typing the @ command resets the unit to the default dialing method (#1) and resets all dialing sequences to the default information.

### 1-6 Commands (Invoke Dialing)

Simply typing either 1,2,3,4,5 or 6 instructs the unit to send the matching sequence to the secondary phone line.

### ? Command (Help)

Type a question mark (?) to show the complete list of commands.

## Programming the Unit from the Telephone

The Dial Method and all dialing sequence information can be programmed from a touch-tone phone connected to the primary phone jack (marked "Phone"). As define previously, the Dial Method is how the user initiates a call. A dialing sequence defines how the secondary phone (or device) rings, what Caller ID information is sent, and what type of Caller ID signaling is used.

### Changing the Dial Method

There are three types of dial methods available as show below. The default is number one, single digit dialing.

- #1 = *One Digit* dialing – user picks up the primary phone and dials a number. The dialing sequence that matches the number dialed is sent to the secondary line.
- #2 = *Multi-Digit* dialing – user picks up the primary phone and dials a phone number of any length. Three seconds after the last digit is dialed, the dialing sequence that matches the last number will be sent.
- #3 = *dial Upon Pickup* – User simply picks up the phone and after three seconds, the unit sends the dialing sequence #1.

To change the Dial Method, pick up the telephone connected to the primary phone line jack (marked "Phone"), and enter:

**\*#99n#** (where n =1,2 or 3 depending on the Dial Method chosen)

For example, if you would like to change the Dial Method to #2, dial: **\*#992#**.

## Programming the Dialed Sequences

Six different dialing sequences are contained within the unit's non-volatile memory. Sequences define the Caller ID signaling type, ring type generated, and the Caller ID information sent (Date/Time, Number, and Name). Each dialing sequence contains five pieces (or fields) of information: Phone Number, Name, Date & Time, Format, and Distinctive Ring type. The field name, field number, valid entry for the field, and length of entry is defined in the table below:

	CID Number	CID Name	Date/Time	CID Signal	Ring Type
Field #	1	2	3	4	5
Valid Entries	Numbers Only	Letters & Numbers	Numbers Only	One Number	One Number
Length	12 or less	15 or less	Exactly 8	1	1

To program a dial sequence, pick up the phone connected to the primary phone line jack (marked "Phone"), and dial:

**\*#[Sequence Number][Field Number][Data Entry]#**

The "\*"#" combination puts you into the program mode. Then you choose the sequence number (1-6), the field number (1-5), and enter your data. The last "#" saves the data entered and terminates the program mode.

### Telephone Programming Examples

#### Example #1 – Programming the Caller ID number

You would like to program 888-555-1212 as the Caller ID number in sequence #2. Pick up the phone connected to the primary line and dial the following digits:

\*# (Invoke programming mode)  
 2 (Select Sequence #2)  
 1 (Select Field #1 –the Caller ID number field)  
 8885551212 (Enter Caller ID phone number)  
 # (Save entry and terminate programming mode)

#### Example #2 – Programming the Caller ID name

This time you would like to program a Caller ID name. Because letters can only be represented by a combination of numbers on telephone keypads, programming names is a bit more difficult. The system employed on the ZX-1004 unit requires two numbers to represent each letter entry. The two-number combination defining each letter chart is listed below:

A = 21	B = 22	C = 23
D = 31	E = 32	F = 33
G = 41	H = 42	I = 43
J = 51	K = 52	L = 53
M = 61	N = 62	O* = 63
P* = 71	R = 72	S = 73
T = 81	U = 82	V = 83
W = 91	X = 92	Y = 93
Q = 11	Z = 12	space = 13

\* Entering a single "P" in the name field instructs the unit to generate a "Private" Caller ID name. A single "O" entered will produce an "Out-of-Area" name.

Let's assume you want to program "TEST" as the Caller ID name in the dialing sequence #1. Pickup the primary phone and dial the following digits:

\*# (Invoke programming mode)  
 1 (Select Sequence #1)  
 1 (Select Field #2 – the Caller ID name field)  
 81327381 (81= T, 32= E, 73= S, 81= T)  
 # (Save entry and terminate programming mode)

Due to the complexity of entering letters, we suggest that you write down the number string to be programmed before entering the digit string. You may have noticed that the letter codes have a pattern to them. With the exception of “Q” and “Z” most telephone keypads have letters printed with the number. The number “3” has the letters “DEF”. Because “E” is the second letter, its number code is “32”, short for 3<sup>rd</sup> number, 2<sup>nd</sup> letter.

Example #3 – Programming a complete dialing sequence

The following shows an example of programming an entire dialing sequence. We want to program sequence #4 with the Caller ID number "7702637111", the Caller ID name "John Smith", the Date and Time "October 12, 1:55pm", the ring type "1" (standard ring), and the Caller ID signaling format as "1" (USA format). As a reminder, the "\*#" combination puts the unit into programming mode, the first digit in the sequence number, the next digit is the field number, then the data is keyed in, followed by the "#" to save and exit from the programming mode.

- \*#417702637111#                    4 (Sequence #), 1 (Number Field), 7702637111 (Phone Number)
- \*#4251634262137361438142#    4 (Sequence #), 2 (Name Field), 51 63 42 62 13 73 61 43 81 42 (John Smith)
- \*#4310121355#                    4 (Sequence #), 3 (Date & Time Field), 10 12 13 55 (Oct. 12, 13:55 [1:55pm])
- \*#441#                                4 (Sequence #), 4 (Format Field), 1 (Format #1 - USA)
- \*#451#                                4 (Sequence #), 5 (Ring Field), 1 (Ring Type #1 - Normal ring)

**Private & Out-of-Area records**

In order to instruct the unit to send out an "Out-of-Area" message as the phone number, enter the single number “2” in the phone number field. A "Private" message will be sent as the phone number when a single “3” is entered into the phone number field.

To send an "Out-of-Area" Caller ID name, simply enter an “O” in the name field. A single “P” will send out “Private” as the Caller ID name.

**Reset to Factory Defaults**

Since all settings and dialing sequences are stored in non-volatile memory, rebooting the unit will not affect any changes you have made. In order to return the unit to the default Dial Method and the default Dialing Sequences, simply pickup the phone connected to primary line and dial:

\*#77#

The default Dial Method is:

#1 = *One Digit* dialing – user picks up the primary phone and dials a number. The dialing sequence that matches the number dialed is sent to the secondary line.

The default Dialing Sequences are:

Seq. #	CID Number	CID Name	Date/Time	CID Signal	Ring Type
1	9987654321	John Smith	06070809	1	1
2	3214567890	ABC Inc.	06070809	1	1
3	8901234567	Susan Jones	06070809	1	1
4	8002404637	CallerID.com	06070809	1	1
5	7702637111	CallerID.com	06070809	1	1
6	7702630049	CallerID Fax	06070809	1	1

## Appendix A

### Country Formats

There are two basic types of Caller ID delivery by the local phone company's central office (CO) telephone switch: Frequency-Shift -Keyed (FSK) and Dual Tone Multi-Frequency (DTMF), commonly referred to as touch-tones. Many variations of each of these two basic methods are seen throughout the world. FSK delivery is a newer technology and can only be generated by CO switches that have this capability. The advantage of FSK delivery is that additional alphanumeric data can be sent along with the Caller ID number, such as local Date & Time and the Caller ID name. Outdated CO switches, found primarily in emerging regions of the world, can only deliver DTMF based Caller ID signals. DTMF based Caller ID systems can only deliver the Caller ID number.

#	Name	Type	Description	Format Detail	Name Sent
1	Belcore 202(a)	USA (w/ name)	FSK after 1 <sup>st</sup> ring	Ring, FSK	Yes
2	Belcore 202(b)	USA (# only)	FSK after 1 <sup>st</sup> ring	Ring, FSK	No
3	British Telecom	United Kingdom	FSK before 1 <sup>st</sup> Ring	Wink, Alert Tone, FSK, Ring	Yes
4	DTMF(a)	Standard DTMF	DTMF before 1 <sup>st</sup> ring	<i>Let. A</i> , Number, <i>Let. C</i> , Ring*	No
5	DTMF(b)	Alternate India	DTMF after 1 <sup>st</sup> ring	Ring, Number	No
6	DTMF(c)	Standard India	DTMF before 1 <sup>st</sup> ring	Number, Ring	No
7	ETSI	European	FSK after short ring	Short Ring, FSK, Ring	Yes

\* The DTMF spectrum that can be delivered by a central office telephone switch not only includes 0-9, \*, and #, but also the letters **A**, **B**, **C**, and **D**. The terms "*Let. A*" and "*Let. C*" refer to these letter DTMF tones.

### Ring Types (Distinctive Ring Delivery)

Distinctive Ring service is offered by some telephone companies at an additional charge and is prevalent only in the US and Canada. If this service is available, the telephone company assigns as many as four different phone numbers to one physical phone line. The ring pattern that is sent varies based on the phone number dialed. Many companies use Distinctive Ring to share one phone line between multiple devices answering the phone. The following table shows the specification for Distinctive Ring.

#	Reference	Ring Pattern	Pattern Details
1	A	Normal (Very Long)	2 Seconds <i>ON</i>
2	B	Long-Long	800ms <i>ON</i> - 400ms <i>OFF</i> - 800ms <i>ON</i>
3	C	Short-Long-Short	300ms <i>ON</i> - 200ms <i>OFF</i> - 1000ms <i>ON</i> - 200ms <i>OFF</i> - 300ms <i>ON</i>
4	D	Short-Short-Long	400ms <i>ON</i> - 200ms <i>OFF</i> - 400ms <i>ON</i> - 200ms <i>OFF</i> - 800ms <i>ON</i>



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