OPERATOR'S MANUAL
MODEL LS15E+ TRIPLE

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All requests for repairs should be directed to the factory.

This instrument is warranted against defective workmanship and materials for a period of six months. There will be no warranty when the instrument is misused, or when the factory seal on the instrument is broken.

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Specification and price change privileges are reserved.

SECTION 1

INTRODUCTION

Micro Seven, Inc. model LS15-E+ TRIPLE contains Alarm-Receiver Simulator/Tester and alarm receiver. The Alarm-Receiver Simulator/Tester function provides simulated telephone-line and alarm receiver for testing and demonstrating alarm panels for the Ademco® (registered trade mark by ADEMCO Group, a division of Pittway) Contact ID, SIA-FORMAT and 4+2 pulse format protocols. The simulated telephone-line functions include generation of dual-frequency-type dial and ring-back tones, detection of DTMF and rotary-pulse dialing pulses, and battery-feed function. The LS15-E+ provides handshake tones for both 4+2 pulse, SIA-FORMAT and Contact-ID formats. The 4+2 pulse format includes features for SIA DC-02-1992.02 (R2000.05) 4.1.3 SIA Pulse Format P3. The SIA-FORMAT mode meets specification of SIA DC-03. As a contact-ID alarm receiver, LS15-E+ provides functions of generation of handshake tones and kiss-off tones, receiving alarm messages, check-sum calculation, and transmitting alarm messages in ASCII format at RS232C interface to a PC. It operates with an AC adapter that is provided with LS15-E+. An alarm panel may be connected directly bypassing telephone companies at line 1 or may be connected to telephone lines at line 2. The Alarm-Receiver Simulator function is available at line 1, and regular alarm receiver function is available as CPE port at line 2. Alarm receiver software for contact-ID method is provided.

Introduction of alarm-receiver function

Traditionally, when alarm panels are tested in the manufacturing or demonstrated in the sales offices, alarm receiver with two public telephone lines are required in addition to a computer. The Micro Seven model LS15E+ eliminates an alarm receiver and two telephone lines by combining both of telephone line simulator and alarm receiver functions for the application. Here, an alarm panel is connected to the line 1 of LS15E+. The RS232C port of a PC is connected to the rear panel connector of LS15E+ with special cable and connector that are provided with LS15E+. Micro Seven's LS15E+ control software provides a tool to display incoming alarm messages. First, the alarm panel goes off-hook at line 1. The loop current is flowing at the line 1. Then, the alarm panel dials either primary telephone number "2" (single digit) or secondary telephone-number that is assigned for line 2(programmable one) depending on which telephone number scheme is selected. When the dialed number is correct, the LS15E+ provides ring-back tone for two seconds. Then, there is no sound for four seconds. And ring-back tone is generated for two seconds. After 0.6 seconds, the LS15E+ transmits handshake tones of 1400 and 2300Hz for 100 ms each separated with 100 ms silence period. When the alarm panel receives the handshake tones, the alarm panel transmits a string of alarm message in DTMF tones with a check-sum at the end. When the alarm message with correct check-sum is received by LS15E+, it transmits the kiss-off tone to the alarm panel. LS15E+ also transmits the ASCII equivalent of the alarm message at the RS232C interface to the PC. Then, the alarm panel either transmits a new alarm message after a short delay or hangs up with the telephone line to terminate the call. If the alarm panel did not receive the kiss-off tone, the alarm panel may repeat transmitting the same alarm message four times. When LS15E+ sees the on-hook-state, it turns off the loop current for a few hundred milliseconds as a disconnect signal. Then, LS15E+ is now ready for a new call from the alarm panel. LS15E+ is compatible with the Ademco ® Contact ID Protocol for Alarm System Communications. Programmed parameters are restored upon powering off and on unless noted.
The line 2 of LS15E+ contains CPE (customer provided equipment) circuit to interface PBX inside line. If there is ring signal input at line 2, an off-hook relay is turned on to represent off-

hook condition. After short time delay, LS15E+ transmits handshake tones of 1400 and 2300Hz in 100 ms each separated with 100 ms silence period. The rest of alarm receiver sequence is the same as for line 1 as follows: when the alarm panel receives the handshake tones, the alarm panel transmits a string of alarm message in DTMF tones with a check-sum at the end. When the alarm message with correct check-sum is received by LS15E+, it transmits the kiss-off tone to the alarm panel. LS15E+ also transmits the ASCII equivalent of the alarm message at the RS232C interface to the PC. Then, the alarm panel either transmits a new alarm message after a short delay or hangs up with the telephone line to terminate the call. If the alarm panel did not receive the kiss-off tone, the alarm panel may repeat transmitting the same alarm message four times. When the alarm panel hangs up the call, it produces disconnect signal that interrupts loop current at line 2. Then, LS15E+ turns off the off-hook relay. Then, LS15E+ is now ready for a new call from the alarm panel. LS15E+ is compatible with the Ademco ® Contact ID Protocol for Alarm System Communications. Programmed parameters are restored upon powering off and on unless noted.

SPECIFICATIONS

Handshake tone priority:
Unless 4+2 pulse and SIA-FORMAT are individually disabled by the control software, handshake tone for SIA-FORMAT is generated first. . If there is no signal received for SIA-FORMAT, handshake tone for 4+2 is generated. Then finally if there is no signal received by LS15E+/4+2, handshake tone for Contact-ID is generated.

Handshake tones for SIA-FORMAT:
2225Hz: -20 dBm nominal power, -30 dBm power in the line impairment mode, duration of 500ms-1sec

Kiss-off tones for SIA-FORMAT (Acknowledge tone):
2025 (positive) or 2225 (negative), -20 dBm nominal power, -30 dBm power in the line impairment mode, duration of 500ms-1sec

Handshake tones for Contact-ID:
1400: 1400+/- 1Hz, duration of 100 ms +/- 1.5 ms, silence period of 100 ms +/- 1.5 ms, and
2300Hz: 2300+/-2 Hz duration of 100 ms +/- 1.5 ms

Kiss-off tones for Contact-ID:
1400 +/- 1 Hz with duration of 750 ms

Handshake and kiss-off tones for Pulse 4X2: 1400 Hz, handshake duration of 1 sec, kiss-off tone duration: 750ms minimum

Pulse 4X2 Format supports SIA DC-02-1992.02, 4.1.3 SIA Pulse Format P3:
Data carrier frequency: 1900 Hz
Data modulation rate: 20 pulses/sec
Data inter-digit time: 500ms
Subscriber ID field: 4
Event code: 2
Verification: double transmission

Alarm message baud-rate for SIA-FORMAT: 110 and 300 baud
There is an ASCII ‘1’ for receiving speed synchronizing signal in 110 baud, or ‘3’ for receiving speed synchronizing signal in 300 baud.

Contact-ID:
Maximum number of alarm messages that are received at line 1 or line 2 for transmission at line 2: 16
Number of retransmission of alarm messages because of no kiss-off tone received from alarm receiver: 4
Maximum number of redialing telephone number: 3
Programmable dialing telephone number: maximum 32 digit programmable by control software, WLS15E+.exe
Dialer enable/disable flag is enabled/disabled by control software, WLS15E+.exe.

Dialing: (same as the telephone line simulator function)
Telephone numbers:

1. Primary telephone number
2. Secondary telephone number

DTMF dialing signal power: -13dBm to +5dBm per a frequency with maximum 4dB difference between frequencies.
Pulse dialing: Break period: 45 to 75 ms (60 ms nominal), make period: 30 to 60 ms (40 ms nominal)

DTMF detecting signal power for alarm messages: -23dBm to +5dBm per a frequency with maximum 4dB difference between frequencies
Alarm message DTMF signal on time (Burst ON time): 50 ms minimum
Alarm message DTMF signal off time (Burst OFF time): 50 ms minimum 400 ms maximum
Note: Contact ID protocol requires Burst ON and OFF times to be 50 ms minimum and 60 ms maximum.

Line characteristics: (same as the telephone line simulator function)

Audio amplifier and control
Internal speaker is included to hear dialing, alarm messages, handshake and kiss-off tones for both line 1 and line 2. Audio output is also available at audio connector on the back panel. A potentiometer is also included to adjust audio amplitude at the speaker. There may be two types of potentiometers that are used to this purpose. One type is to generate sound at its maximum amplitude at its fully clock-wise direction of the potentiometer. The other type is to generate sound at its maximum amplitude at its fully counter-clock wise direction of the potentiometer.

Battery-feed voltage at line 1: (loop voltage): -20 volts

Off-hook impedance requirement at line 1: 400 ohms maximum DC, 600 ohms nominal AC(same as the telephone line simulator function)

Call Progress Tones at line 1: single frequency or dual frequency type selected by control software

Stutter dial tone at line 1: selected by control software

Line Input Jacks at line 1 and line 2: USOC-RJ11-C, standard modular phone jack

Programmable disconnect-signal at line 1: by control software

CPE port at line 2:

High voltage isolation: 1500VRMS between lines and RS232C connector.
Ring signal detector: opto-coupler
Signal isolation: telephone coupling transformer
Off-hook impedance: 50 ohms typical
High o-hook impedance is obtained by off-hook mechanical relay.
Handshake tone is produced after 1.8 seconds when the off-hook relay is turned on.

RS232C Interface:
Speed: 1200 baud, with one stop bit, no parity bit
The interface signals: Receive Data, Transmit Data, Data Set Ready, Clear-to-send, and ground. The Data Terminal Ready signal is forced high at LS15E+ meaning that a PC is always ready to receive data from LS15E+.
Connector: 9-pin D-sub on LS15E+ the rear panel
Cable(9-pin M/9-pin F) is provided.
Received alarm messages are computed for the checksum.

AC/DC Adapter(provided with LS15E+): 117VAC +/- 5%, or 230VAC +/- 5%(for optional 230V AC/DC Adapter)
AC/DC Adapter or Car Battery Adapter input: 12VDC unregulated, 800mA maximum
Line Status Display: red LED for each line to indicate off-hook status (continuous on)
Calibration: not required because digitally synthesized tones
Power-On Indicator: green LED display
Dimensions: 19 cm (4") W x 4.5 cm (1.75") H x 10 cm (7.5") L
Weight: 400g (0.8 LBS.)
Environmental: Operating temperature: 0 to 35 degree C, Humidity: 85% RH at 35 degree C
Warranty/Service: 6 months limited warranty. No warranty if any factory seal is broken. Service is performed at the factory, usually within 5 working days.

Options and Accessories:
Car Battery Adapter
230V input AC/DC Adapter (117V input unit is a standard.)

Reference for Contact-ID: Digital Communication Standard-SIA DC-05-1999.09, Ademco Contact ID Protocol for Alarm System Communications

Reference for SIA-FORMAT: Digital Communication Standard-SIA DC-03

Reference for Pulse 4X2: Digital Communication Standard-SIA DC-02, 4.1.3 SIA Pulse Format P3

SECTION 2

EMAIL/WAVEFILE/COMMPORT PROGRAMMING

Programming of email parameters is accomplished with the software “centralprogram.exe”. The specified wavefile may be played for specified length as shown. If email transmission is not required, unmark the button shown below. RS232 communication port needs to be input into the window shown. Auto comport detection may be provided by this software for selecting communication port automatically among port 1 and port 9. Leave it in “COM1” if your Control Panel in Windows systems in PC allows changing communication port.

2.1 Email parameters

1. SMTP Server contains a name of email server. The SMTP server must be non SLL type, i.e. smtp.yourcompany.com.
2. Username of your email account, i.e. administration@yourcompany.com
3. Password of your email account
4. Sender contains your name and your email address, i.e., John Young <security1@yourcompany.com>
5. Subject of email, i.e. “LS15E+-Reporting alarm condition”.
6. From address, i.e. alarmreceiver1@yourcompany.com
7. To address, (email address)
8. Each subscriber’s email address is contained under each account number in “**custemail**” directory. For example, file “1234” contains an email address of the subscriber’s account. Leave it blank if you do not want to send alarm messages to subscriber’s email address. Leave it blank if there is no primary email address. Do not enter carriage return at the end.
9. Enable/disable email transmission by button control

2.2 Music file is played upon alarm conditions with the following controls:

1. Wavefile, location of music file with “wav” extention
2. Wavefile playing length in seconds upon receiving alarm conditions or events
3. Enable/disable playing wave file music upon receiving alarm conditions or events by control

2.3 Subscriber’s profile information

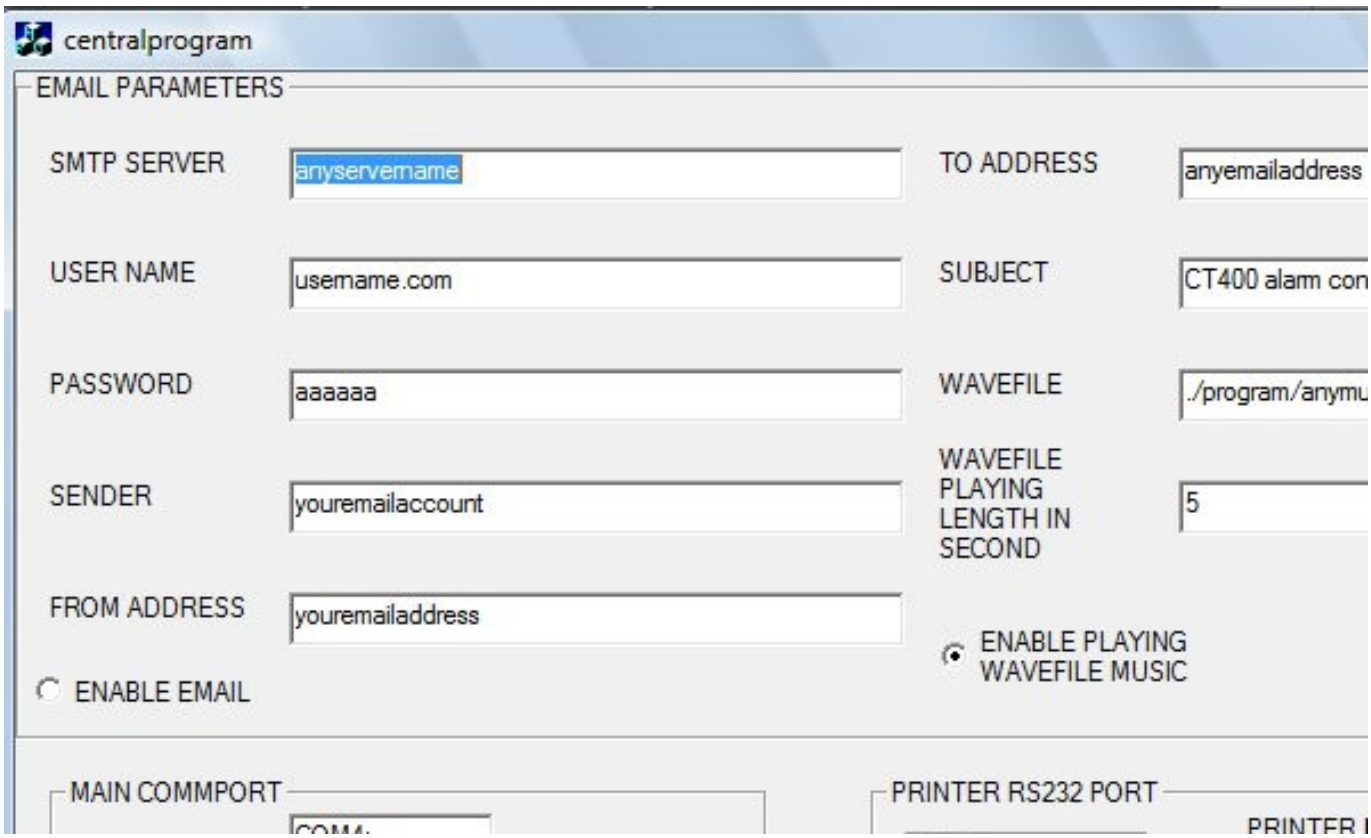
Each subscriber’s profile information that may include name, address, and phone number may be included under each account number in “**customer**” directory. For example, file “1234” may contain name, address and phone number of account holder 1234. The example of profile information is as follows:
Abc corporation
1234 NE Broadway

Anycity, Anystate
Zip code
Phone number555-555-5555
Fax 555-555-5555
Email address
Name John Smith

2.4 RS232 ports

The main comport contains communication port number as COM1:.
Click “AUTO COMMPORT DETECTION” for automatically searching RS232 port.

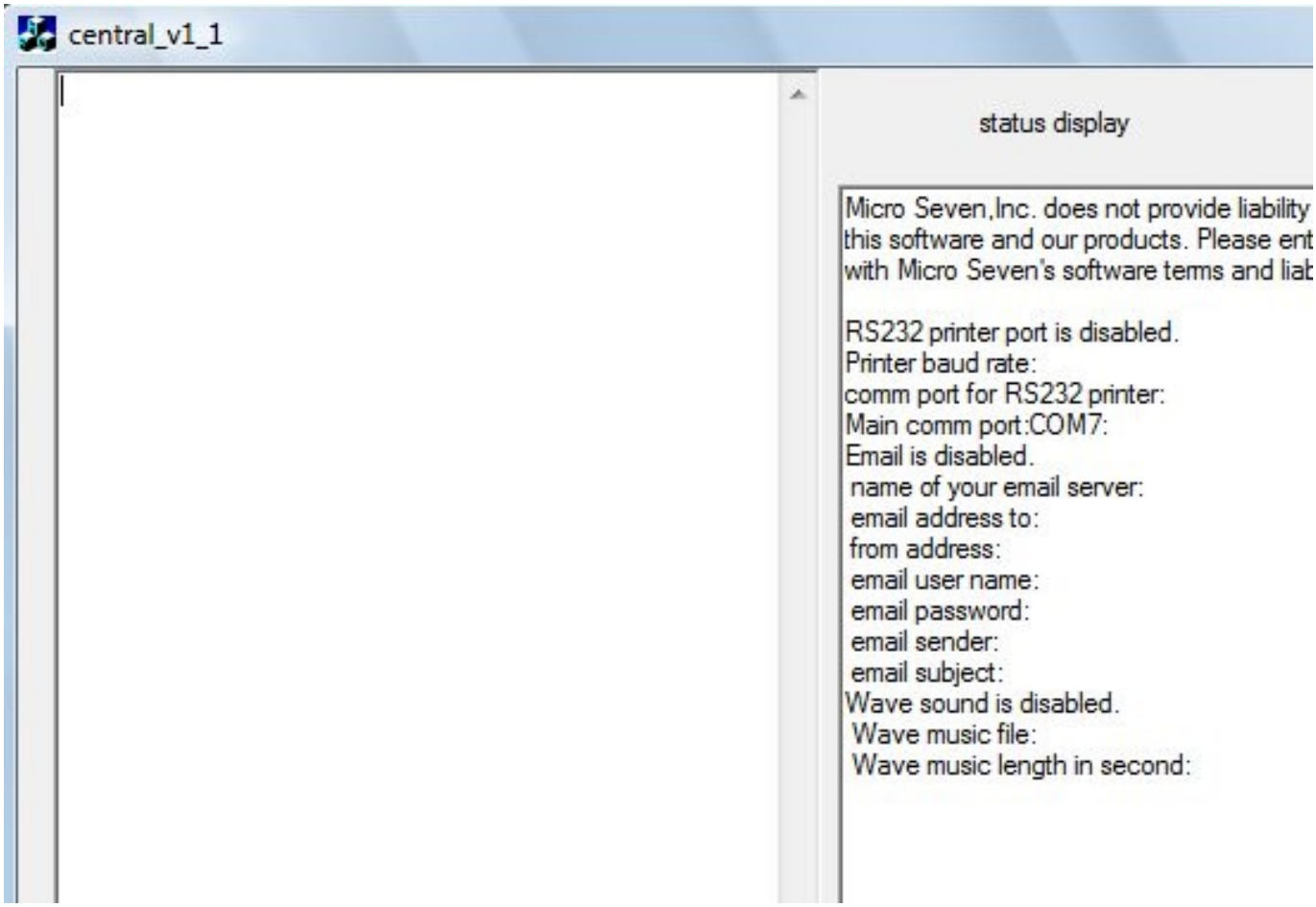
The printer RS232 port outputs decoded alarm signals. Enter comport number and baudrate after highlighting “ENABLE PRINTER”.



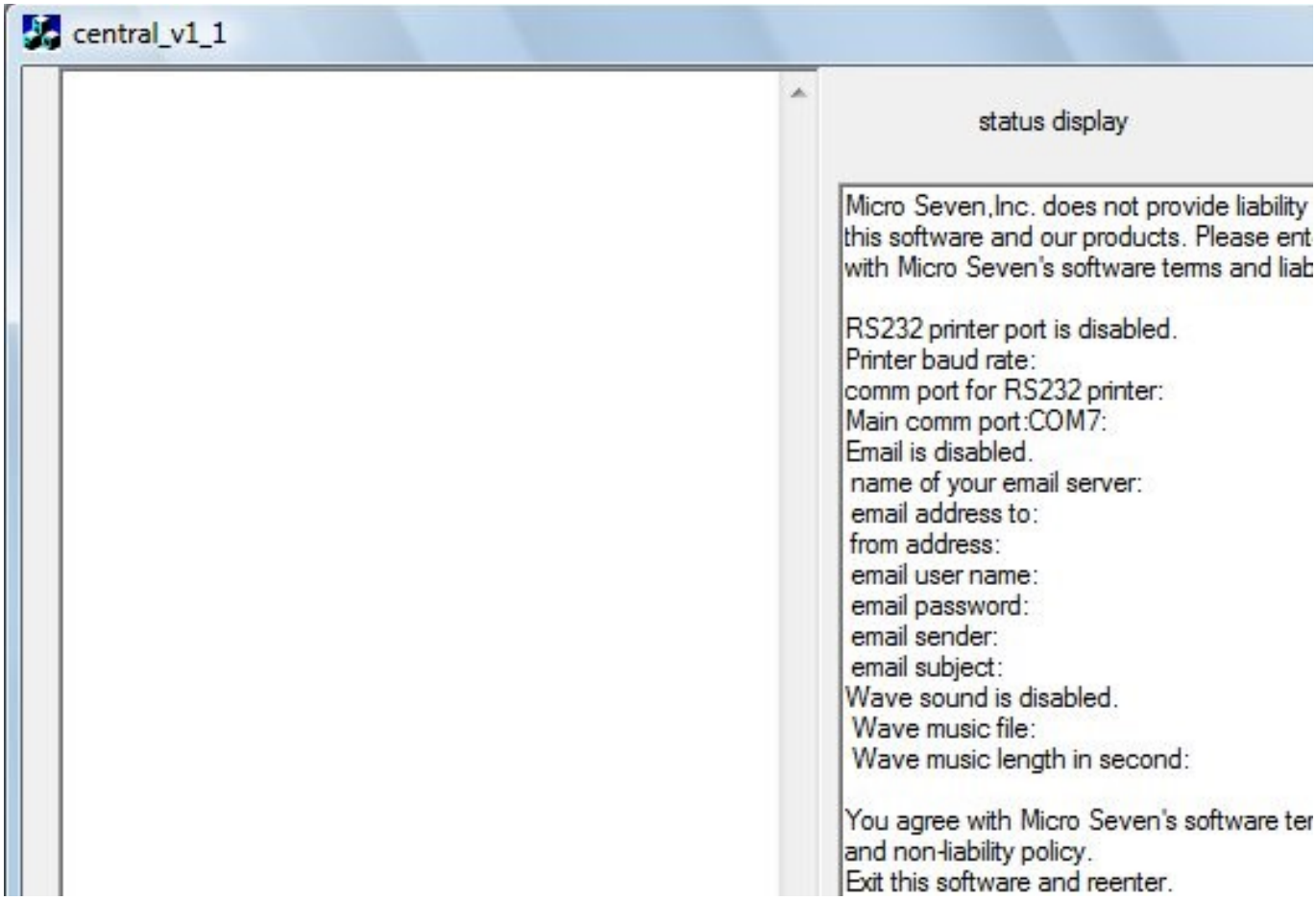
SECTION 3

ALARM RECEIVER SOFTWARE

The “central_v6.exe is the main alarm receiver software for decoding received alarm messages for all three protocols including Contact-ID, Pulse 4+2, and SIA-FORMAT modes.
“centralprogram.exe” is for programming email, comport and wavefile music.
All software must reside in the same file directory. History file “al.txt” is generated in the same directory for listing all decoded messages for all three modes.
After programming with “centralprogram.exe”, liability question is displayed on screen. After following the instruction on screen and acknowledging no liability from Micro Seven, Inc., alarm receiver software is enabled.



10 tripleman12/20/214:07 PM



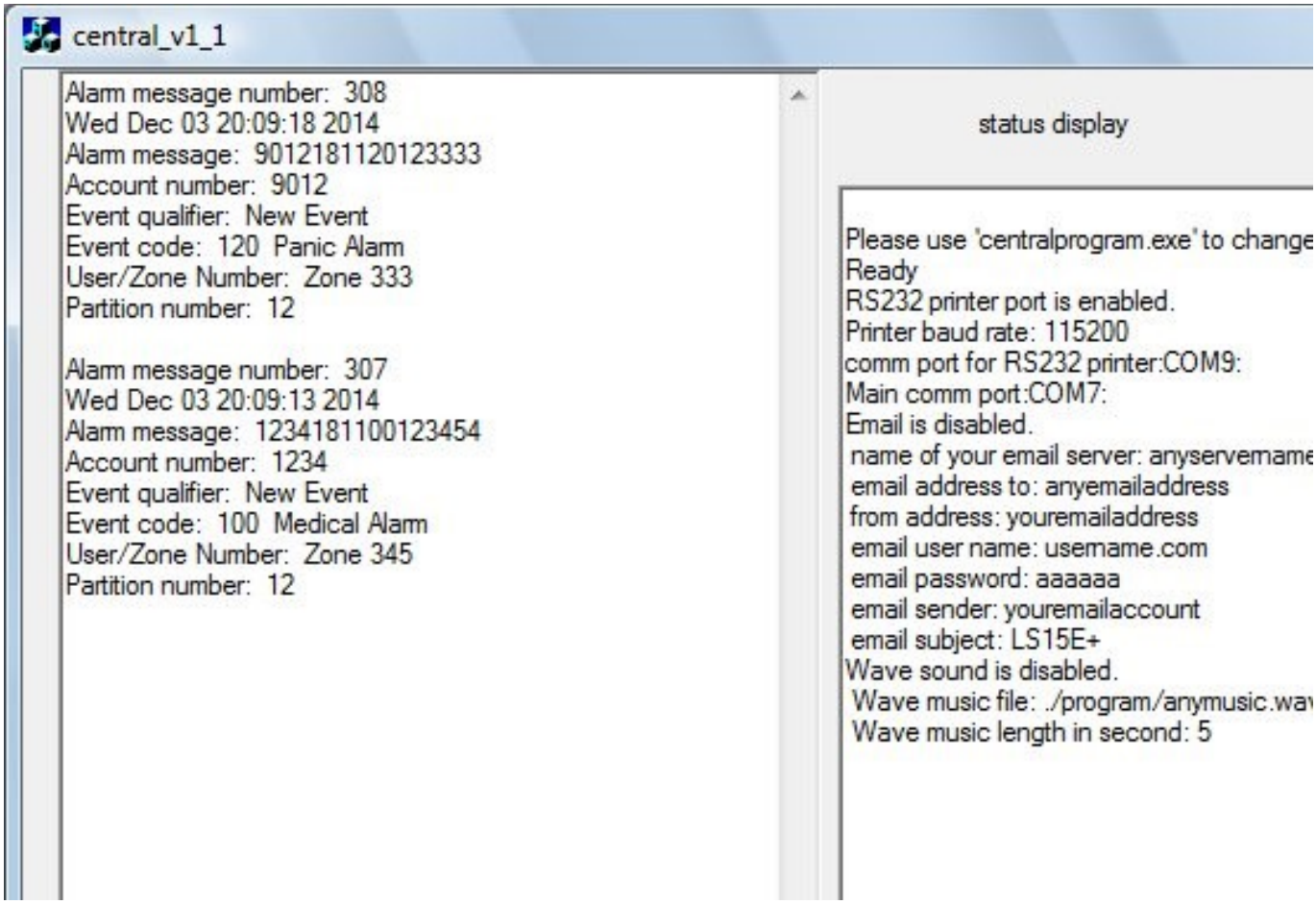
The main screen of the receiver software is displayed as shown below. The left hand side shows consecutive received alarm messages from line number (1-4), consecutive alarm message number, month/date/year/time, complete alarm message, account number, event qualifier, event code with decoded event, user/zone and partition.
The right hand side of the screen shows programmed modes for email on/off, printer on/off, sound on/off and programming data for email transmission, and printer and sound before any alarm is received. New alarm message is displayed in this portion. The decoded alarm messages are saved as history file in computer disk file and also they are transmitted to RS232 printer when enabled.

The following event codes for SIA-FORMAT are recognized for decoding alarm messages:
FA - fire alarm
MA - medical alarm
GA - CO alarm
QA – console emergency
NA – inactivity alarm
AB – alarm central
MI – reminder timeout alarm
AR – AC restore
AT – no AC
YR – good console battery
YT – low console battery
FT – fire sensor low battery
GT – CO sensor low battery
MT – medical sensor low battery

FS – fire sensor supervision error
GS – CO sensor supervision error
MS – medical sensor supervision error
UB – inactivity monitor disable
UR – inactivity monitor enable
RP – status report
TW – video callback

Pulse 4+2 contains 4-digit account number and event from the following list:

0: Test
1: Fire
2: Panic
3: Burglary
4: General Alarm
5: General Alarm
6: General Alarm
7: Medical
9: Restore
B: Open
C: Close
D: Cancel
E: Restoral
F: Trouble


central_v1_1
Alarm message number: 308
Wed Dec 03 20:09:18 2014
Alarm message: 9012181120123333
Account number: 9012
Event qualifier: New Event
Event code: 120 Panic Alarm
User/Zone Number: Zone 333
Partition number: 12
Alarm message number: 307
Wed Dec 03 20:09:13 2014
Alarm message: 1234181100123454
Account number: 1234
Event qualifier: New Event
Event code: 100 Medical Alarm
User/Zone Number: Zone 345
Partition number: 12
status display
Please use 'centralprogram.exe' to change
Ready
RS232 printer port is enabled.
Printer baud rate: 115200
comm port for RS232 printer:COM9:
Main comm port:COM7:
Email is disabled.
name of your email server: anyservemame
email address to: anyemailaddress
from address: youremailaddress
email user name: username.com
email password: aaaaaa
email sender: youremailaccount
email subject: LS15E+
Wave sound is disabled.
Wave music file: ./program/anymusic.wav
Wave music length in second: 5

3.1 RS232 interface specifications

This specification is for reading data directly from Micro Seven's alarm receiver without using Micro Seven's central station software or DLL software components.

Note: Readers are assumed to be familiar with Digital Communication Standard-SIA DC-05-1999.09, Ademco Contact ID Protocol for Alarm System Communications.

3.2 RS232 signals

1200baud

1 stop bit and no parity for all communications

CTS hardware handshake signal

RTS and DTR signals that hold PC transmission to alarm receiver are not monitored, and they are assumed for asserted at the interface.

3.3 Received data-Contact-ID

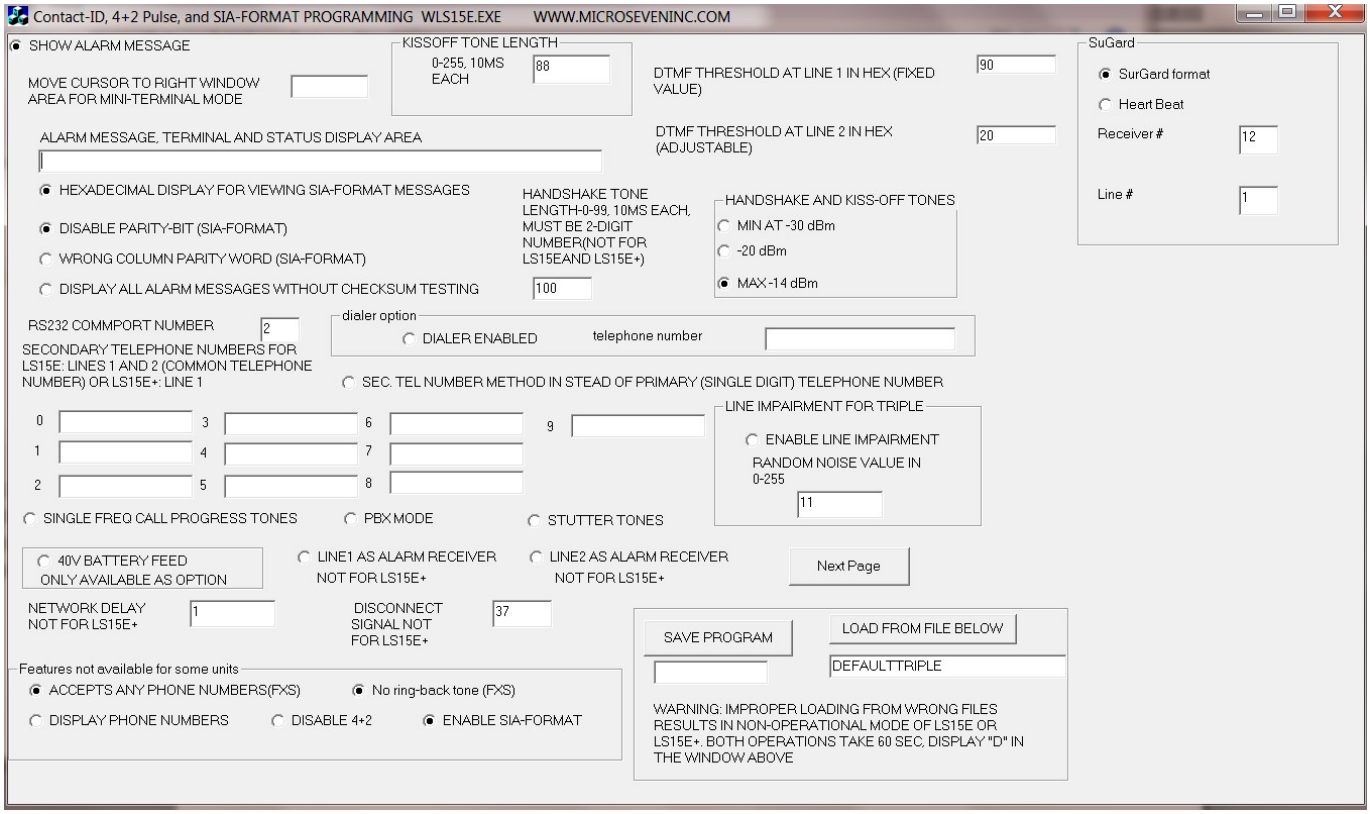
Sixteen character ASCII data including a checksum character is output to PC as shown below:
1234181131010158<CR>
First four characters "1234" are account number, "18" for Contact-ID message, "1" for new message, "131" for the event "Perimeter Burglary", "01" for the partition, "015" for the zone, "8" for the checksum and carriage return (hex 0DH).

3.4 LS15E+ CONTROL SOFTWARE, WLS15E+.EXE

Installation procedure

The following files are required in your disk file to operate WLS15E.EXE.
WLS15E+.EXE
Commport

Caution: "commport" file must contain RS232 port number as exactly as "COM1:". To read port number assignment, go to "communication port" in the "device manager". The port number must be in single digit number. New single digit port number may be assigned in the "device manager". Restart of PC is required to effect the port assignment.



SHOW ALARM MESSAGE

Showing received Contact-ID alarm messages in the display window area below.

MOVE CURSOR TO RIGHT WINDOW AREA FOR MINI-TERMINAL MODE

Reading and writing data memory between PC and LS15E+ may be done by moving the cursor to the edit window on the right and type for example “R55” , and the data memory content is shown in the large display window below.

KISSOFF TONE LENGTH (CONTACT-ID)

Enter a new number in the edit window on its right. Each count is 10 ms long.

DISABLE PARITY-BIT: Disable transmission of negative acknowledge tone after receiving a wrong parity bit. The column parity checking is still valid.

Wrong column parity word:
Selects a wrong starting data pattern instead of hexadecimal FF for column parity word.

HEXADECIMAL DISPLAY-selecting hexadecimal notated alarm message for SIA-FORMAT modeIt is not for LS15E+. Alarm messages are shown in hexadecimal notation of a byte; “30” for ASCII “1”, “41” for ASCII “A”, etc. instead of ASCII characters.

HANDSHAKE TONE LENGTH-It is not for LS15E+ TRIPLE.

HANDSHAKE AND KISSOFF TONES (AMPLITUDE) PROGRAMMING (CONTACT-ID):
selectable among –14, -20, and –30 dBm amplitude

RS232 COMMPORT NUMBER-enter RS232 communication port number in the edit window area. If it is invalid number “?” is shown in the large display area.

SECONDARY TELEPHONE NUMBER METHOD IN STEAD OF PRIMARY (SINGLE DIGIT) TELEPHONE NUMBER:
The secondary telephone number is selected, ten different telephone numbers are provided as shown in the ten edit windows. Each telephone number is compatible for dialing at both line 1 and line 2. Programmed telephone numbers are stored in EEROM.

LINE IMPAIRMENT FOR TRIPLE
When it is enabled, random noise is added to handshake signal and kiss-off tone. The amount of random noise is programmable by entering a decimal number of 0-255 into the edit window. The factory default is 11 for –55 dBm.

DTMF threshold of Contact-ID mode are shown at two edit windows. The DTMF detect threshold for line 1 is fixed at 90 hex. The DTMF detect threshold at line 2 is programmable. The factory default is 20 hex.

SINGLE FREQUENCY CALL PROGRESS TONES

When it is not selected, the dual frequency call progress tones are enable.

PBX MODE

Dialing “9” would produce dial tone again.

STUTTER TONES

When it is enabled, the dial tone is interrupted several times.

40V BATTERY FEED

If it is not selected, the battery feed voltage is 21 volts. 40V battery feed is only available for 40V battery feed option for both LS15E and LS15E+.

LINE1 AS ALARM RECEIVER and LINE2 AS ALARM RECEIVER(not for LS15E+)

If it is not selected, telephone line simulator function is enabled. The factory default of LS15E is that line 1 as alarm receiver and line 2 as telephone line simulator.

NETWORK DELAY(not for LS15E+)

Delay between 0 and 2.55 seconds may be programmed to simulate network delay which is time delay between end of dialing and beginning of ring signal generation at called line.

DISCONNECT SIGNAL(not for LS15E+)

Disconnect signal is sent at the other line when the line becomes on-hook. During the disconnect signal period, loop current is turned off. It is programmable between 0 and 2.55 seconds with 10 ms increment.

SAVE PROGRAMMED VALUE IN THE FILE BELOW

Click the button for storing programmed value in EEROM for 256 bytes in selected file name below. It takes about 60 seconds, and a character “D” is shown in the large display area.

LOAD FROM FILE BELOW

Click the button for loading programmed value into EEROM from the file which is shown in the edit window area. . It takes about 60 seconds, and a character “D” is shown in the large display area. The factory default file is “def0512.14”, which is provided in a CD.

Dialer enable/disable

When it is enabled, received alarm messages are transmitted at line 2, FXO interface.

Dialing telephone number

Enter your other central station telephone number for LS15E+ to dial and transmit received alarm messages. When time delay after dialing “9” is dialed, enter “,” as in “9,18005551212”. Each “,” adds 2.2 seconds of delay.

ACCEPTS ANY PHONE NUMBERS (FXS)

Instead of receiving certain telephone numbers for primary or secondary telephone number, any sequence of telephone numbers are accepted. Received telephone number is displayed in the edit window of the status display area when the “**DISPLAY PHONE NUMBERS**” is marked.

DISABLE 4+2

When it is highlighted, answer tone for 4+2 mode is not generated.

ENABLE SIA-FORMAT

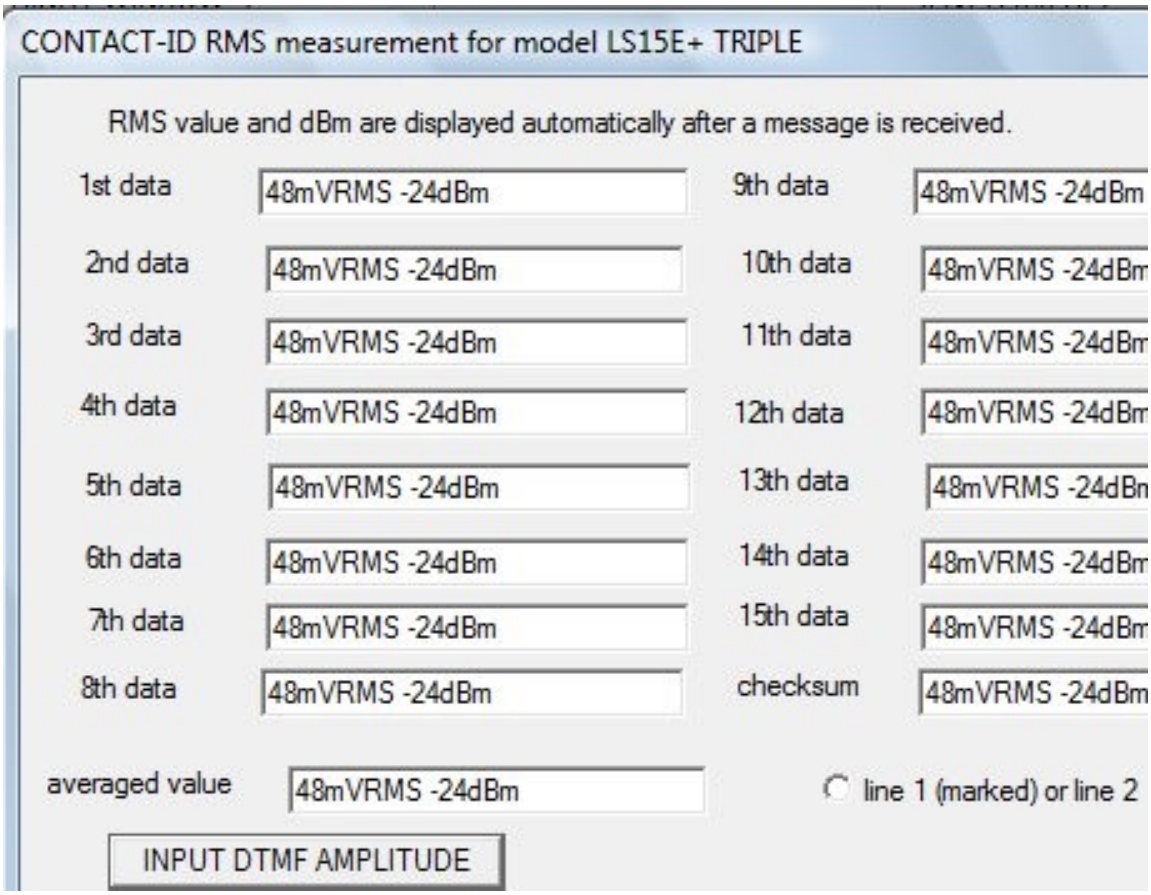
When it is highlighted, answer tone for SIA-FORMAT mode is generated.

No ring-back tone (FXS)

When it is highlighted, ring-back tone is not generated.

RMS amplitude measurement of Contact-ID alarm messages

Click “Next Page”, and the screen is changed for amplitude measurement of Contact-ID messages by “INPUT DTMF AMPLITUDE”, the following screen is displayed with each amplitude measurement data for each DTMF signal for sixteen segments.


CONTACT-ID RMS measurement for model LS15E+ TRIPLE
RMS value and dBm are displayed automatically after a message is received.
1st data
48mVRMS -24dBm
9th data
48mVRMS -24dBm
2nd data
48mVRMS -24dBm
10th data
48mVRMS -24dBm
3rd data
48mVRMS -24dBm
11th data
48mVRMS -24dBm
4th data
48mVRMS -24dBm
12th data
48mVRMS -24dBm
5th data
48mVRMS -24dBm
13th data
48mVRMS -24dBm
6th data
48mVRMS -24dBm
14th data
48mVRMS -24dBm
7th data
48mVRMS -24dBm
15th data
48mVRMS -24dBm
8th data
48mVRMS -24dBm
checksum
48mVRMS -24dBm
averaged value
48mVRMS -24dBm
line 1 (marked) or line 2
INPUT DTMF AMPLITUDE

SECTION 4

ADDITIONAL FEATURES

Note: the following programming is normally not required for most of operations, and its programming is done by using commercially available Hyperterminal software or by using the alarm monitor mode (MOVE CURSOR TO RIGHT WINDOW AREA FOR MINI-TERMINAL MODE)as described in the section 3.4.

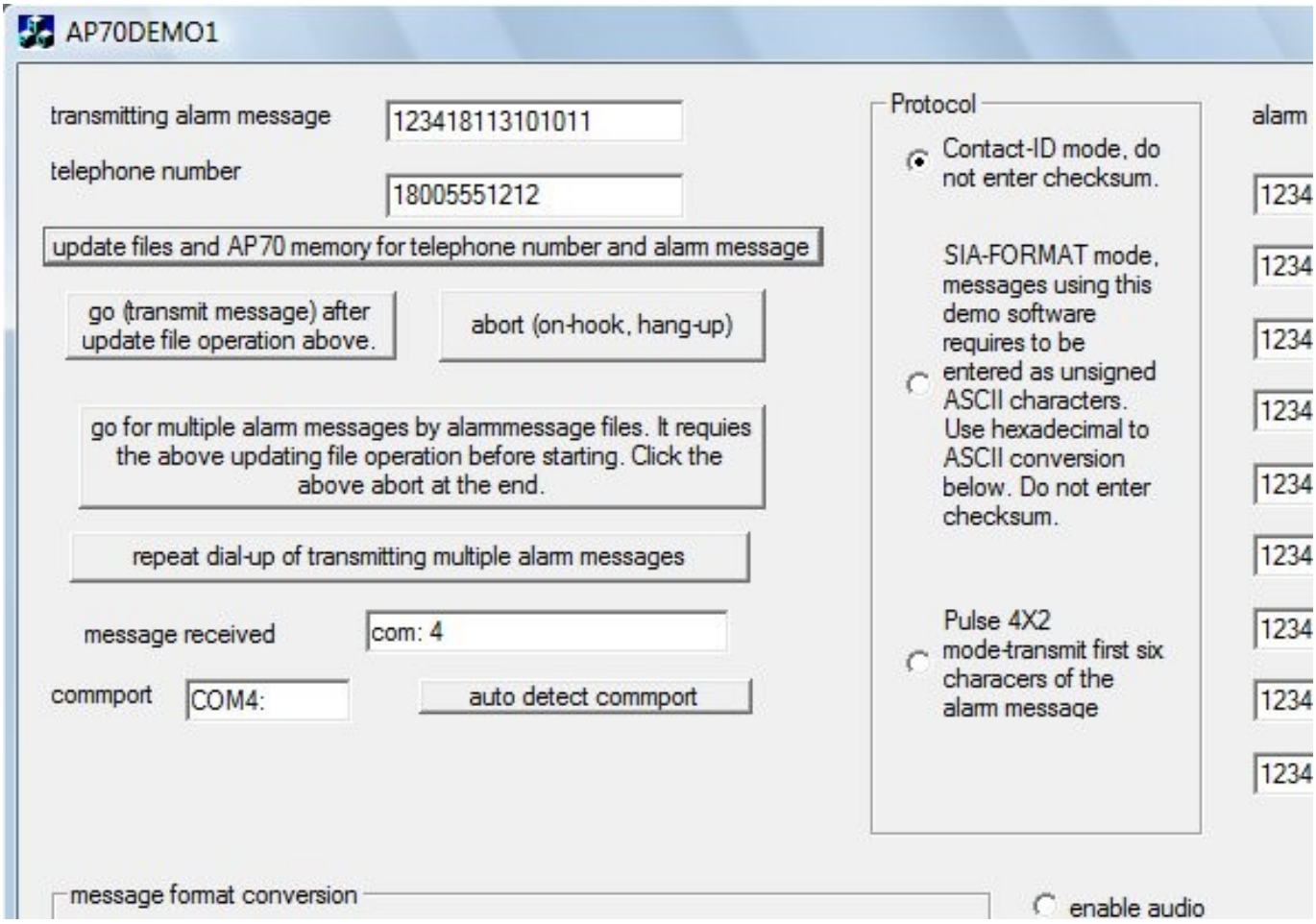
4.1 Number of ring programming

The number of ring period before the off-hook relay at line 2 is turned on for an incoming call is programmed by:
MF9 n1 n2, where n1 and n2 in hexadecimal notation forms one byte. MF902 programs the factory-default two ring-period. MF900 programs the shortest ring signal. Note that one ring period consists of ring-on period and ring-off period, and the off-hook relay is turned on the beginning of next ring period.

SECTION 5

CENTRAL MONITOR SOFTWARE FOR ALL PROTOCOLS

The central monitor software, centralmonitor.exe, displays received alarm signals for all modes. The screenshot of the centralmonitor.exe is shown below. The demo is by done by AP70 demo program for AP70, Alarm Panel Simulator or PC Alarm Panel by Micro Seven, Inc.



centralmonitor.exe for LS15E+ TRIPLE
1234181131010 11C 1234181131010 12B 1234181131010130 1234181131010149 1234181131010158 12341811310
31010176 1234181131010185 1234181131010194