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Social alarm systems — IP signalling protocols

Part 2: Specification for NOW-IP



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Summary of pages

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Foreword

Publishing information

This part of BS 8521 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 April 2020. It was prepared by Subcommittee GW/1/12, *Social alarms*, under the authority of Technical Committee GW/1, *Electronic security systems and products*. A list of organizations represented on these committees can be obtained on request to their secretary.

Relationship with other publications

This British Standard forms the second part of BS 8521. The existing BS 8521 is expected to become BS 8521-1 at its next revision.

This standard is intended to provide requirements for specialized group living environments. For other social alarm applications, PD CLC TS 50134-9:2018 should be considered.

Information about this document

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Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

Communications providers continue to converge voice traffic on to their packet-based IP (internet protocol) infrastructures, supported by the removal of a regulatory obligation to support in-call, tone-based signalling. This will further compromise the reliability of tone-based protocols. It is expected that this will reduce the performance of tone-based alarm transmissions below the requirements for a social alarm system established in BS EN 50134-5.

This standard defines an IP communications protocol for social alarm systems, optimized for specialized grouped living environments. This standard addresses a need for an openly defined standard for information and control exchange between social alarm equipment and alarm response centres (ARC) over a public or private IP network.

PD CLC/TS 50134-9 specifies a protocol for point-to-point transmission of alarms, faults, control signals and communications monitoring, optimized for a combined (standalone) Local Unit and Controller and an Alarm Receiving Centre using the IP.

The system performance characteristics for alarm transmission are specified in BS EN 50134-5.

The performance characteristics of the Local Unit and Controller should conform to the requirements of the BS EN 50134 series.

1 Scope

This British Standard specifies requirements for the transfer of information and control signals between social alarm equipment used in specialized group living environments and alarm receiving centres (ARCs).

It provides for the establishment of a common signalling protocol over a public or private IP network to ensure that social alarm systems from different manufacturers exchange essential information and controls in a compatible manner.

This British Standard specifies a protocol for point-to-point transmission of alarms, faults, control signals and communications monitoring using the Internet Protocol (IP) to enable communication of the following:

- a) alarm information;
- b) speech path and system control commands;
- c) selection of local units in grouped equipment;
- d) request for information on outstanding calls;
- e) speech control functions;
- f) equipment control functions;
- g) programming;
 - parameter programming;
 - parameter remote enquiry; and
- h) streaming media, e.g. voice.

NOTE 1 The alarm protocol is intended for use over any network that supports the transmission of IP data with sufficient quality of service to support VoIP.

NOTE 2 The alarm protocol is defined as an XML scheme including the alarm types, codes and necessary additional information.

The alarm protocol is an application layer protocol using another IP as a transport protocol to handle addressing and transport functions. The transport protocol initially defined in this standard is Session Initiation Protocol (SIP).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[N1] ROSENBERG, J., SCHULZRINNE, H., CAMARILLO, G., JOHNSTON, A., PETERSON, J., SPARKS, R., HANDLEY, M., SCHOOLER, E. *SIP: Session Initiation Protocol*. RFC 3261. Internet Engineering Task Force, June 2002.

[N2] ROSENBERG, J., SCHULZRINNE, H., HUITEMA, C., GURLE, D. *Session Initiation Protocol (SIP) Extension for Instant Messaging*. RFC 3428. Edited by B. CAMPBELL. Internet Engineering Task Force, December 2002.

[N3] SCHULZRINNE, H., CASNER, S., FREDERICK, R., JACOBSON, V. *RTP: A Transport Protocol for Real-time Applications*. RFC 3550. Internet Engineering Task Force, July 2003.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1.1 alarm call

signal transmitted by the controller to an alarm receiving centre (or on-site staff) to indicate an alarm condition or a fault condition

[SOURCE: BS EN 50134-7:2017, **3.14**, modified – on-site staff added]

3.1.2 alarm receiving centre (ARC)

system part which provides facilities for communication with a number of controllers, and provides the alarm receiving and information processing system as an interface to the alarm recipient

[SOURCE: BS EN 50134-1:2002, **3.2**]

3.1.3 alarm recipient

person who receives and acts upon an alarm signal

[SOURCE: BS EN 50134-1:2002, **3.14**]

3.1.4 alarm transmission message

XML message body used in the transmission of non-voice communication between a local unit and an alarm-receiving centre (ARC)

NOTE The format of the message is defined in [5.2.3.2](#).

3.1.5 controller

interface between one or more local units and the alarm transmission system or alarm recipient

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

3.1.6 grouped living system

social alarm system (3.1.8) designed to support multiple users in a specialized grouped living environment (3.1.9), using a shared social alarm infrastructure

NOTE 1 for example shared transmission path and/or shared interconnections.

NOTE 2 Normally these systems contain multiple local units connected to a single controller; however, some grouped living systems utilize multiple combined local unit and controller devices connected to local alarm transmission systems that converge on a local gateway device (a PBX or a router) before sharing a common alarm transmission system linking the site to the ARC.

3.1.7 local unit

interface between the user and the controller which enables two-way speech

[SOURCE: BS EN 50134-1:2002, 3.3]

3.1.8 social alarm system

system providing 24 h facilities for alarm triggering, identification, signal transmission, alarm reception, two-way speech communication, reassurance and assistance

[SOURCE: BS EN 50134-1:2002, 3.1]

3.1.9 specialized grouped living environment

accommodation that provides independent living for occupants who are wholly or mainly limited to a specific section of population and who are likely to require additional measures to secure their safety and wellbeing, including, but not limited to, accommodation provided for elderly people, children and people with a physical or mental impairment

NOTE Such environments are distinct from a nursing home or residential care home, in that the residents are usually able to look after themselves, or require limited personal support, are active and are afforded a degree of independence.

3.1.10 tone-based signalling

signalling protocol utilizing structured tones comprising audible frequencies for the communication of information

3.2 Abbreviations

For the purposes of BS 8521-2, the following abbreviations apply.

AES	Advanced Encryption Standard
ARC	Alarm Receiving Centre
ATM	Alarm Transmission Message
CA	Certificate Authority
DTMF	Dual Tone Multi-Frequency
LD	Loop Disconnect
IP	Internet Protocol
ITU	International Telecommunications Union
LUC	Local Unit and Controller
MESSAGE	A SIP extension that allows the transfer of instant messages

PIR	Passive Infra-Red
PSTN	Public Switched Telephone Network
RTP	Real-time Transport Protocol
SIP	Session Initiation Protocol
SIMPLE	Session Initiation Protocol for Instant Messaging and Presence Leveraging Extensions
Simplex	A speech mode in which the direction of speech transmission is controlled by the ARC
TCP	Transmission Control Protocol
TLS	Transport Layer Security
UDP	User Datagram Protocol
VoIP	Voice over IP
VOX	A speech mode which is bi-directional and where any required control of direction of speech transmission takes place automatically at the local unit
WAN	Wide-Area Network
XML	eXtensible Markup Language

4 Alarm and status messages

4.1 General requirements

COMMENTARY ON 4.1

Grouped living systems can be implemented in a number of ways, including:

- a) a social alarm controller which is registered with the ARC SIP registrar and provides control and routing of all communications with the local units connected to it;*
- b) a local SIP registrar within the grouped living system connecting the local units to each other and the ARC. The local SIP registrar is registered to the ARC SIP registrar, which removes the need for the local units to be directly registered with the ARC SIP registrar; and*
- c) local units at the grouped living system directly registered to the ARC SIP registrar.*

This protocol is designed to operate in all of the above grouped living system implementations and the system configuration type (see [Table 1](#)) is intended to communicate the local implementation to the ARC. It is expected that the ARC would utilize the information conveyed by the system configuration type to manage and route its communications with the local units within the grouped living system.

The alarm transport protocol shall adhere to both RFC 3261 [N1] and RFC 3428 [N2]. The media stream shall conform to RFC 3550 [N3].

4.2 Alarm transmission message format

The message sent by the local unit and controller to the ARC shall consist of the following information content:

- a) **system configuration**, comprising a system configuration assignment (see [Table 1](#)) and a speech link type (see [Table 2](#));
- b) **system type assignment**, to indicate to the ARC whether the local unit and controller is using the standard protocol or a proprietary variant (see [4.4](#));

- c) **controller identification**, which is the eight-digit controller identification field, to uniquely define the identity of the specific site/installation;
 - d) **local unit identification field**, to uniquely define the identity of the local unit within the installation – this information is encoded as four digits;
- NOTE 1 In grouped equipment, the controller has the reserved identity of 0000.*
- e) **event code**, to define the nature of the alarm (see [Table 3](#));
 - f) **location information field**, to allow detailed locations of alarm events to be indicated (see [Table 4](#));
 - g) **priority field**, to indicate that a priority over other alarms has been assigned to this event (see [Table 5](#)); and
 - h) **status code**, to indicate the status of the local unit (see [Table 6](#)).

NOTE 2 For a combined local unit and controller, the unique identity of that specific unit is given by the combined twelve digits of the local unit and controller and local unit fields as a single entity.

NOTE 3 All identifier fields, whether for combined local unit and controller or in respect of c) and d) are right justified and padded with leading zeros.

Table 1 — Configuration system type

System type and local unit status	Single digit encoding
Local unit and controller	0
Grouped equipment with supervisor off duty	1
Grouped equipment with supervisor on duty	2
Grouped equipment with supervisor on duty acting as an ARC	3
ARC	4
Grouped equipment with supervisor off duty – local unit directly addressable	5
Grouped equipment with supervisor on duty – local unit directly addressable	6
Grouped equipment with supervisor on duty acting as an ARC – local unit directly addressable	7
Reserved to BSI	8–9

NOTE Default scheme configuration means that a local unit is not directly addressable from outside the system and this is represented by digit values 1, 2 and 3.

Table 2 — Speech link type

System link type	Single digit encoding
Non-speech	0
VOX	1
Controlled switched speech	2
Reserved to BSI	3–9

Table 3 — Three-digit codes for alarm events

Three-digit encoding	Alarm event/reason
000	No alarm event/reason information/cancelled
001 to 009	Undefined/unallocated
010	Fixed trigger 1
011	Fixed trigger 2
012	Pressure mat

Table 3 (continued)

Three-digit encoding	Alarm event/reason
013	Door contact
014	Passive infra-red (PIR) detector
015	Boundary breach
016	Smoke
017	Fire
018	Bogus caller trigger
019	Personal trigger 1
020	Personal trigger 2
021	Fall trigger 1
022	Fall trigger 2
023	Personal attack 1
024	Personal attack 2
025	Panic button
026	Carbon monoxide gas
027	Natural gas
028	Intruder
029	Automatic person down
030	Property exit 1
031	Property exit 2
032	High temperature
033	Low temperature
034	Temperature rate of rise
035	Medication dispenser
036	Enuresis
037	Bed occupancy
038	Chair occupancy
039	Property occupancy 1
040	Property occupancy 2
041	Bathroom occupancy
042	Seizure
043	Inactivity
044	Environmental monitor
045	Bed monitor
046	Chair monitor
047	Flood
048	Bath level
049	Lighting circuit
050	Heating
051	Mains power
052	System power supply
053	Battery
054	Duty switch
055	Door open
056	Fire door open
057	System status