Proprietary Extension for

COMMON-ISDN-API

Version 2.0

**Tone detection and generation extension
for DTMF Facility**

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Motivation: By introduction of additional indications
- 'X' : recognition of FAX tone CNG (1.1 kHz)
- 'Y' : recognition of FAX tone CED (2.1 kHz)

within the DTMF facility functions, a step has been made to provide the application with information about specific tones on the line that help to make decisions in automatic voice/FAX procedures.

It is desirable to extend this set of indications in order to address further scenarios in voice/FAX applications:

- The application should be able to identify a situation in automatic FAX transmission where the given phone number turns out to be a subscriber's voice number instead of the FAX number.
- It should be possible for an application to detect the presence of an answering machine on the remote site and to automatically leave a message not before the announcement of the answering machine has finished.
- In practice there seem to be telephone connections where a busy or out of order condition is only reported via in-band tones. Interpretation of these tones would therefore be useful.

The following new indications are introduced in this document:

- A set of in-band tone indications are reporting in-band signals, such as special information or busy tone.
- Additional FAX/modem tone indications are reporting events, such as modem CNG or FAX flag detection.
- Human speech detected reports that speech is received from the remote site.
- MF tone detection is defined, but not for use in this environment.
- A general indication "unidentified tone detected" provides that all signals on the line are reported.
- "End of signal detected" indicates that no signal is present on the line.

For an application it would also be useful to be able to issue certain signals to the line while tone detection is active for example to send out a FAX calling tone while waiting for an appropriate signal. This is also addressed by the tone detection and generation extension for DTMF Facility. In order to keep symmetry, a similar set of signals is defined for tone sending as for tone detection.

To enable future extensions to the set of tone signals and to allow a **COMMON-ISDN-API** to only implement part of the tone detectors and generators, a mechanism has been introduced where an application can determine the subset that is actually implemented in the **COMMON-ISDN-API**.

To reduce the additions required in a CAPI application in order to make use of the extension, the new functionality is added directly to the existing DTMF facility functions. This means that could be a risk of conflict with future official extensions of the **COMMON-ISDN-API**.

To prevent incompatibilities, support for tone detection and generation has to be enabled explicitly so as to turn off any future CAPI extension that would cause incompatibility.

Specially, it has to be enabled by the application for a designated controller through a manufacturer request command 9 (Options request) with bit 5 (Enable DTMF tone detection and generation support) set. It will stay active until either the application releases the **COMMON-ISDN-API** or issues another options request with bit 5 not set.

An application can determine whether the **COMMON-ISDN-API** supports tone detection and generation within the DTMF Facility by examining the CAPI profile and searching the manufacturer string for "Eicon" or by examining the CAPI profile and trying the manufacturer command 9 described below.

Release Notes:

Changes since the first version from 30.11.2000:
- Added a tone code for *Answering Machine Tone (390 Hz)*.

Changes since the second version from 13.5.2002:
- Added support for dial pulse detection, i.e. added the functions *Start dial pulse detector* and *Stop dial pulse detector* and the digit codes '0' to '9'.

Changes since the third version from 11.8.2003:
- Added tone codes for qualified special information tones.
- Added a tone code for the *Tone Alerting Signal* used with caller ID transmission in the PSTN.

Changes since the fourth version from 13.1.2004:
- Added support for DTMF clamping by two new functions *Enable DTMF Clamping* and *Disable DTMF Clamping*.

Changes since the fifth version from 29.3.2004:
- Adopted additions from CAPI extension AK1-179 (Support of DTMF trailing edge detection).
- Defined a tone code 0xF0 *recognition of falling edge of MF tone* to offer a similar functionality for MF detection as AK1-179.

Changes since the sixth version from 14.5.2004:
- Added support for hook signaling via new functions *Start hook detector*, *Stop hook detector*, *Send hook* and the new digit codes *Hook digit 0* to *Hook digit 9*, *Hook flash*, *Hook ring*, *Hook state off hook* and *Hook state on hook*.

Changes since the seventh version from 7.1.2009:
- Added support for DTMF detection on the audio that is sent to the COMMON-ISDN-API via DATA_B3_REQ. This detector is controlled via a new facility selector 250 *DTMF on data* using the same messages as for facility selector 1 *DTMF*. It enables DTMF detection for example on life audio passed to the COMMON-ISDN-API.

- Added support for generation and detection of R2 register signaling forward and backward tones via new functions *Start R2 forward listen*, *Stop R2 forward listen*, *Send R2 forward tones*, *Start R2 backward listen*, *Stop R2 backward listen, Send R2 backward tones*. Also added new digit codes for R2 forward and backward tones.

For automated FAX transmission, a scenario could be as follows:

- The application enables the tone detection and generation extension (only needs to be done once after CAPI_REGISTER).
- A DTMF Facility request with function 248 (Get supported detect tone codes) and a request with function 249 (Get supported send tone codes) is issued for the controller to determine its capabilities. Fallback procedures might be applied if required generators or detectors are not present in the lists returned by COMMON-ISDN-API.
- An outgoing transparent call is established.
- A DTMF Facility request is issued with function 250 (Start tone detector).
- Sending of FAX calling tone is started by a DTMF Facility request with function 252 (Send tone) and a DTMF digits struct consisting of the byte 0xC1 (FAX calling tone).
- A timeout timer is started.
- If one of the answer tone signals 0x59 (recognition of FAX tone CED, 2.1 kHz), 0xC2 (Answer tone detected), 0xC3 (Answer tone with phase reversals detected), 0xC4 (ANSam detected), 0xC5 (ANSam with phase reversals detected) or 0xC7 (FAX flags detected) is received, the connection may be switched to FAX via SELECT_B_PROTOCOL.
- If an indication 0xC8 (G2 FAX group ID detected) is received, the application may decide to hang up because G2 FAX is not supported by the CAPI.
- Indication 0x81 (Unidentified tone detected), 0x58 (recognition of FAX tone CNG, 1.1 kHz) and 0xC1 (FAX calling tone detected) and all reserved tone indications should be ignored since they might have been triggered by far end echo.
- If any one of the in-band progress tones is detected, appropriate action may be taken.
- If a DTMF Facility indication that contains 0xC9 (Human speech detected) is received, that means probably a person, an answering machine or an automatic FAX/voice discriminator took the call, and therefore some time should be given for the person / device to transfer the call to a FAX machine. 0x80 (End of signal detected) would mean that a gap in the speech has been detected. This might be seen as an indication that the transfer of the call is in progress. If an unexpected disconnect occurs now, it might be assumed that a subscriber's voice number was given instead of the FAX number. If there is no valid FAX answer for a longer period of time, then the presence of an answering machine or person but no FAX capability might be concluded.
- If a disconnect occurred before any valid tone was detected, it might be assumed that a subscriber's voice number was given instead of the FAX number.
- If no indication was detected during the timeout period, a "dead" line might be assumed.

An automated text message transmission scenario could be as follows:

- The application enables the tone detection and generation extension (only needs to be done once after CAPI_REGISTER).
- A DTMF Facility request with function 248 (Get supported detect tone codes) and a request with function 249 (Get supported send tone codes) is issued for the controller to determine its capabilities. Fallback procedures might be applied if required generators or detectors are not present in the lists returned by COMMON-ISDN-API.
- An outgoing transparent call is established.
- A DTMF Facility request is issued with function 250 (Start tone detector).

- If a DTMF Facility indication 0x81 (Unidentified tone detected) is received, then that means probably a person or an answering machine took the call and therefore the start of the message that is to be sent should be delayed until 0x80 (End of signal detected) has been seen and a short time elapsed without any further signal indication.
- If any one of the in-band progress tones is detected, appropriate action may be taken.
- While the text message is transmitted indication 0x81 (Unidentified tone detected) and 0xC9 (Human speech detected) should be ignored since it might have been triggered by far end echo.

4.2.2.7 CAPI_GET_PROFILE

Applications call CAPI_GET_PROFILE to retrieve capability information from **COMMON-ISDN-API**. **COMMON-ISDN-API** copies information about implemented features, the total number of controllers and protocols supported by the requested controller to a 64-byte buffer passed by the calling application. The application must ignore unknown bits. **COMMON-ISDN-API** sets every reserved field to zero. CAPI_GET_PROFILE fills the buffer with the following structure:

Type	Description
2 bytes	number of installed controllers, least significant byte first
2 bytes	number of supported B-channels, least significant byte first
4 bytes	Global Options (bit field): [0]: internal controller supported [1]: external equipment supported [2]: Handset supported (external equipment must also be set) [3]: DTMF supported [4]: Supplementary Services (see Part III) [5]: channel allocation supported (leased lines) [6]: parameter *B channel operation* supported [7]: Line Interconnect supported [8]...[31]: reserved
4 bytes	B1 protocol support (bit field): [0]: 64 kbit/s with HDLC framing, always set. [1]: 64 kbit/s bit-transparent operation with byte framing from the network [2]: V.110 asynchronous operation with start/stop byte framing [3]: V.110 synchronous operation with HDLC framing [4]: T.30 modem for fax group 3 [5]: 64 kbit/s inverted with HDLC framing. [6]: 56 kbit/s bit-transparent operation with byte framing from the network [7]: Modem with all negotiations [8]: Modem asynchronous operation with start/stop byte framing [9]: Modem synchronous operation with HDLC framing [10]...[31]: reserved
4 bytes	B2 protocol support (bit field): [0]: ISO 7776 (X.75 SLP), always set [1]: Transparent [2]: SDLC [3]: LAPD in accordance with Q.921 for D-channel X.25 (SAPI 16) [4]: T.30 for fax group 3 [5]: Point-to-Point Protocol (PPP) [6]: Transparent (ignoring framing errors of B1 protocol) [7]: Modem error correction and compression (V.42 *bis* or MNP5) [8]: ISO 7776 (X.75 SLP) modified supporting V.42 *bis* compression [9]: V.120 asynchronous mode [10]: V.120 asynchronous mode supporting V.42 *bis* [11]: V.120 bit-transparent mode [12]: LAPD in accordance with Q.921 including free SAPI selection [13]...[31]: reserved

4 bytes	B3 protocol support (bit field): [0]: Transparent, always set [1]: T.90NL with compatibility to T.70NL in accordance to T.90 Appendix II. [2]: ISO 8208 (X.25 DTE-DTE) [3]: X.25 DCE [4]: T.30 for fax group 3 [5]: T.30 for fax group 3 with extensions [6]: reserved [7]: Modem [8]...[31]: reserved
24 bytes	reserved for **COMMON-ISDN-API** use
4 bytes	Private options (bit field): [0]...[4]: reserved [5]: DTMF tone detection and generation supported [6]...[31]: reserved
16 bytes	Manufacturer-specific information

CAPI_GET_PROFILE information structure

Manu ID (dword)

The purpose of the parameter *Manu ID* is to communicate a dword which identifies the manufacturer in MANUFACTURER messages. Every manufacturer supplying MANU-FACTURER messages should choose a unique value (such as an abbreviation of the company name).

The manufacturer ID used by Dialogic is:

0x44444944

This information element appears in:

MANUFACTURER_REQ
MANUFACTURER_RESP
MANUFACTURER_CONF
MANUFACTURER_IND

Manufacturer Specific

The purpose of the parameter *manufacturer specific* is to exchange manufacturer-specific information.

Manufacturer specific information for MANUFACTURER_REQ:

word	manufacturer command	Manufacturer-specific operation requested.
struct	manufacturer command parameters	Command-dependent parameters for manufacturer request.

Manufacturer specific information for MANUFACTURER_CONF:

word	manufacturer command	Manufacturer-specific operation that was requested.
word	info	Result of the operation according to **COMMON-ISDN-API** definition of Info.

This information element appears in:

MANUFACTURER_REQ
MANUFACTURER_RESP
MANUFACTURER_CONF
MANUFACTURER_IND

The purpose of the parameter *manufacturer command* is to specify the kind of operation requested in a MANUFACTURER_REQ.

The following manufacturer commands are defined:

1:	**Assign PLCI**
2:	**Advanced Codec control**
3:	**DSP control**
4:	**Signaling control**
5:	**RXT control**
6:	**IDI control**
7:	**Configuration control**
8:	**Remove Codec**
9:	**Options request**

This information element appears in:

Manufacturer Specific

Manufacturer Command Parameters

The purpose of the parameter *manufacturer command parameters* is to specify command-dependent parameters.

Parameters for manufacturer command 9: Options Request:

dword	Options mask	Manufacturer-specific options that have to be enabled: [Bit 0..4]: reserved, must be set to 0 [Bit 5]: Enable DTMF tone detection and generation support [Bit 6..31]: reserved, must be set to 0

This information element appears in:

Manufacturer Specific

Facility Selector (word)

The purpose of the parameter *Facility selector* is to identify the requested **COMMON-ISDN-API** facility.

The defined values are:

0	Handset (external ISDN equipment)
1	DTMF (Dual Tone Multi-Frequency)
2	V.42 bis Compression
3	Supplementary Services (described in COMMON-ISDN-API Part III)
4	Power management wakeup
5	Line Interconnect
6	Broadband Extensions
7	Controller Events
8	Echo cancellation
250	DTMF on data
251	Resource reservation
252	Connect support
253	FAX over IP
254	Voice over IP

This information element appears in:

FACILITY_REQ
FACILITY_CONF
FACILITY_IND
FACILITY_RESP

Facility Request Parameter (struct)

The purpose of the parameter *facility request parameter* is to offer additional information concerning the message FACILITY_REQ.

This parameter is coded as a structure with the following elements depending on the value of *facility selector*:

Facility selector:

1	DTMF (Dual Tone Multi-Frequency):
250	DTMF on data:

Function	word	1: Start DTMF listen on B channel data 2: Stop DTMF listen 3: Send DTMF digits 4: Start DTMF listen - rising and falling edge 5..234: Reserved 235: Start R2 backward listen 236: Stop R2 backward listen 237: Send R2 backward tones 238: Start R2 forward listen 239: Stop R2 forward listen 240: Send R2 forward tones 241: Start hook detector 242: Stop hook detector 243: Send hook 244: Enable DTMF clamping 245: Disable DTMF clamping 246: Start dial pulse detector 247: Stop dial pulse detector 248: Get supported detect tone codes 249: Get supported send tone codes 250: Start tone detector 251: Stop tone detector 252: Send tone 253: Start MF listen on B channel data 254: Stop MF listen 255: Send MF digits 256 to n: Reserved
Tone-Duration	word	Function 1 (Start DTMF listen): Time in ms for one digit, default is 40 ms Function 3 (Send DTMF digits): Time in ms for one digit, default is 40 ms Function 4 (Start DTMF listen - rising and falling edge): Time in ms for one digit, default is 40 ms All other functions: reserved, must be set to 0 if present
Gap-Duration	word	Function 1 (Start DTMF listen): Time in ms between digits, default is 40 ms Function 3 (Send DTMF digits): Time in ms between digits, default is 40 ms Function 4 (Start DTMF listen - rising and falling edge): Time in ms between digits, default is 40 ms All other functions: reserved, must be set to 0 if present

Send tone codes	struct	0x00..0x0f: reserved
		Function 243 (Send hook): Signal to be sent 0x10: Hook digit 1 0x11: Hook digit 2 ... 0x19: Hook digit 0 0x1a..0x0b: reserved 0x1c: Hook flash 0x1d: Hook ring 0x1e: Hook state off hook 0x1f: Hook state on hook **Function 3 (Send DTMF digits): Signal to be sent** 0x20..0x22: reserved 0x23: DTMF '#' 0x24..0x29: reserved 0x2A: DTMF '*' 0x2B..0x2F: reserved 0x30: DTMF '0' 0x31: DTMF '1' ... 0x39: DTMF '9' 0x3A..0x40: reserved 0x41: DTMF 'A' 0x42: DTMF 'B' 0x43: DTMF 'C' 0x44: DTMF 'D' 0x45..0x7F: reserved **Function 252 (Send tone): Signal to be sent** 0x80: Tone off for current tone 0x81: reserved 0x82: Dial tone 0x83: PABX internal dial tone 0x84: Special dial tone (stutter dial tone) 0x85: Second dial tone 0x86: Ringing tone 0x87: Special ringing tone 0x88: Busy tone 0x89: Congestion tone (reorder tone) 0x8A: Special information tone 0x8B: Comfort tone 0x8C: Hold tone 0x8D: Record tone 0x8E: Caller waiting tone 0x8F: Call waiting tone 0x90: Pay tone 0x91: Positive indication tone (finite) 0x92: Negative indication tone 0x93: Warning tone 0x94: Intrusion tone 0x95: Calling card service tone 0x96: Payphone recognition tone 0x97: CPE alerting signal 0x98: Off hook warning tone 0x99..0x9F: reserved 0xA0: Special information tone 0 0xA1: Special information tone 1 0xA2: Special information tone 2 0xA3: Special information tone 3 0xA4: Special information tone (operator intercept) 0xA5: Special information tone (vacant circuit) 0xA6: Special information tone (reorder) 0xA7: Special information tone (no circuit found) 0xA8..0xAE: reserved 0xAF: Intercept tone

Send tone codes		Function 237 (Send R3 backward tones): Tones to be sent 0xB0: R2 backward tone off 0xB1: R2 backward 1 ... 0xBF: R2 backward 15 Function 252 (Send tone): Signal to be sent 0xC0: Modem calling tone 0xC1: FAX calling tone 0xC2: Answer tone (finite) 0xC3: Answer tone with phase reversals (finite) 0xC4: ANSam (finite) 0xC5: ANSam with phase reversals (finite) 0xC6: 2225 Hz (Bell 103 answer mode) 0xC7: FAX flags 0xC8: G2 FAX group ID 0xC9: reserved 0xCA: Answering Machine Tone (390 Hz) 0xCB: Tone Alerting Signal (for Caller ID in PSTN) 0xCC..0xCF: reserved Function 240 (Send R3 forward tones): Tones to be sent 0xD0: R2 forward tone off 0xD1: R2 forward 1 ... 0xDF: R2 forward 15 0xE0..0xEF: reserved Function 255 (Send MF digits): Signal to be sent 0xF0: reserved 0xF1: MF '1' 0xF2: MF '2' ... 0xFA: MF '0' 0xFB: MF K1 0xFC: MF K2 0xFD: MF KP 0xFE: MF S1 0xFF: MF ST All other functions: reserved, must be coded as empty struct if present
DTMF Characteristics	struct	Function 1 (Start DTMF listen): Characteristics of DTMF recognition. Function 4 (Start DTMF listen - rising and falling edge): Characteristics of DTMF recognition. All other functions: reserved, must be coded as empty struct if present

Note:
Function 252 (Send tone) starts sending a new signal. If a signal with transient definition is pending, the start of the new signal is delayed until the regular end of the pending one.
For function 248 (Get supported detect tone codes) and function 249 (Get supported send tone codes) only a controller need to be specified in the FACILITY_REQ.
The DTMF clamping function avoids that DTMF tones pass through to line interconnect peers and to the application.
All DTMF and MF digits and those tones marked with "finite" have a finite length. In the Send tone codes struct other digits and tones may be appended to them and COMMON-ISDN-API sends a FACILITY_CONF when the last tone finished rather than when it started.
For function 240 (Send R2 forward tones) and 237 (Send R2 backward tones) the last tone is continuously sent until a next request to send digits or tones is asserted, unless the last code specified is R2 forward tone off or R2 backward tone off.

Sending DTMF characters interrupts the transmission of **DATA_B3_REQ** data. After DTMF generation, the data transmission is resumed. For function 4 *Start DTMF listen - rising and falling edge*, the digit and the end of a digit is signaled as soon as technically possible (directly after the algorithm has reliably detected the presence or absence of a DTMF).

This information element appears in:

FACILITY_REQ

Facility Confirmation Parameter (struct)

The purpose of the parameter *facility confirmation parameter* is to offer additional information concerning the message FACILITY_CONF.

This parameter is coded as a structure with the following elements, depending on the value of *facility selector*:

Facility selector:

1   **DTMF (Dual Tone Multi-Frequency):**
250   **DTMF on data:**

DTMF information	word	0: sending of DTMF info successfully initiated 1: incorrect DTMF digit 2: unknown DTMF request
Supported tone codes	struct	Function 248 (Get supported detect tone codes): Supported detect tone codes array. The LSB of octet 0 indicates implementation of code 0x00, the MSB of octet 31 implementation of code 0xff. Trailing octets that are not present are assumed to be 0x00. Function 249 (Get supported send tone codes): Supported send tone codes array. The LSB of octet 0 indicates implementation of code 0x00, the MSB of octet 31 implementation of code 0xff. Trailing octets that are not present are assumed to be 0x00. All other functions: reserved

This information element appears in:

FACILITY_CONF

Facility Indication Parameter (struct)

The purpose of the parameter *facility indication parameter* is to offer additional information concerning the message FACILITY_IND.

This parameter is coded as a structure with the following elements depending on the value of *facility selector*:

Facility selector:

1   **DTMF (Dual Tone Multi-Frequency):**
250   **DTMF on data:**

Detected tone codes	byte array	0x00..0x0f: reserved
		Hook detector active: Signals in order of detection
		0x10: Hook digit 1
		0x11: Hook digit 2
		...
		0x19: Hook digit 0
		0x1a..0x0b: reserved
		0x1c: Hook flash
		0x1d: Hook ring
		0x1e: Hook state off hook
		0x1f: Hook state on hook
		DTMF listen active: Signals in order of detection
		0x20..0x22: reserved
		0x23: DTMF '#' detected
		0x24..0x29: reserved
		0x2A: DTMF '*' detected
		0x2B..0x2F: reserved
		0x30: DTMF '0' detected
		0x31: DTMF '1' detected
		...
		0x39: DTMF '9' detected
		0x3A..0x40: reserved
		0x41: DTMF 'A' detected
		0x42: DTMF 'B' detected
		0x43: DTMF 'C' detected
		0x44: DTMF 'D' detected
		0x45..0x57: reserved
		0x58: recognition of fax tone CNG (1.1kHz)
		0x59: recognition of fax tone CED (2.1kHz)
		0x5A..0x7D, 0x7F: reserved
		DTMF listen active - rising and falling edge
		0x7E: recognition of falling edge of DTMF / fax tone
		Tone detector active: Signals in order of detection
		0x80: End of signal detected
		0x81: Unidentified tone detected
		0x82: Dial tone detected
		0x83: PABX internal dial tone detected
		0x84: Special dial tone (stutter dial tone) detected
		0x85: Second dial tone detected
		0x86: Ringing tone detected
		0x87: Special ringing tone detected
		0x88: Busy tone detected
		0x89: Congestion tone (reorder tone) detected
		0x8A: Special information tone detected
		0x8B: Comfort tone detected
		0x8C: Hold tone detected
		0x8D: Record tone detected
		0x8E: Caller waiting tone detected
		0x8F: Call waiting tone detected
		0x90: Pay tone detected
		0x91: Positive indication tone detected
		0x92: Negative indication tone detected
		0x93: Warning tone detected
		0x94: Intrusion tone detected
		0x95: Calling card service tone detected
		0x96: Payphone recognition tone detected
		0x97: CPE alerting signal detected
		0x98: Off hook warning tone detected
		0x99..0x9F: reserved
		0xA0: Special information tone 0
		0xA1: Special information tone 1
		0xA2: Special information tone 2
		0xA3: Special information tone 3

Detected tone codes		0xA4: Special information tone (operator intercept) 0xA5: Special information tone (vacant circuit) 0xA6: Special information tone (reorder) 0xA7: Special information tone (no circuit found) 0xA8..0xAE: reserved 0xAF: Intercept tone detected R2 backward detector active: Signals in order of detection 0xB0: recognition of falling edge of R2 backward tone 0xB1: R2 backward 1 ... 0xBF: R2 backward 15 Tone detector active: Signals in order of detection 0xC0: Modem calling tone detected 0xC1: FAX calling tone detected 0xC2: Answer tone detected 0xC3: Answer tone with phase reversals detected 0xC4: ANSam detected 0xC5: ANSam with phase reversals detected 0xC6: 2225 Hz (Bell 103 answer mode) detected 0xC7: FAX flags detected 0xC8: G2 FAX group ID detected 0xC9: Human speech detected 0xCA: Answering Machine Tone (390 Hz) detected 0xCB: Tone Alerting Signal detected (for Caller ID in PSTN) 0xCC..0xCF: reserved R2 forward detector active: Signals in order of detection 0xD0: recognition of falling edge of R2 forward tone 0xD1: R2 forward 1 ... 0xDF: R2 forward 15 Dial pulse listen active: Signals in order of detection 0xE0: Dial pulse digit '1' detected ... 0xE8: Dial pulse digit '9' detected 0xE9: Dial pulse digit '0' detected 0xEA..0xEF: reserved MF listen active: Signals in order of detection 0xF0: recognition of falling edge of MF tone 0xF1: MF '1' detected 0xF2: MF '2' detected ... 0xFA: MF '0' detected 0xFB: MF K1 detected 0xFC: MF K2 detected 0xFD: MF KP detected 0xFE: MF S1 detected 0xFF: MF ST detected

Note:

Detected tone code 0x81 (Unidentified tone detected) is the first indication that reports detection of any signal on the line that is different from the background noise. It will always precede a more specific indication that is reported once the tone is identified.

Detected tone code 0x80 (End of signal detected) indicates that no more tone detection is pending.

This information element appears in:

FACILITY_IND

Facility Response Parameter (struct)

The purpose of the parameter *facility respond parameter* is to offer additional information concerning the message FACILITY_RESP.

This parameter is coded as a structure with the following elements depending on the value of *facility selector*:

Facility selector:

1   **DTMF (Dual Tone Multi-Frequency)**
250   **DTMF on data**
                 Parameter does not apply (coded as structure with a length of 0)

This information element appears in:

FACILITY_RESP