Proprietary Extension for

COMMON-ISDN-API

Version 2.0

Extended Modem Configuration

January 2017

Dialogic Corporation

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Motivation:

To enable specific analog modem applications via **COMMON-ISDN-API**, it is necessary to extend the current B1 protocol 7 (modem with full negotiation) with some additional configuration parameters. This document describes a manufacturer-specific extension to the **COMMON-ISDN-API** that enables extended control over modem settings.

It was sought was to minimize the additions required in a CAPI application in order to make use of the extension; therefore, the parameters are passed via additional structs in the B1 configuration of B1 protocol 7. This means that there could be a risk of conflict with future official extensions of the **COMMON-ISDN-API**. To prevent incompatibilities, support for extended modem configuration has to be enabled explicitly in one of the two ways described below so as to turn off any future CAPI extension that would cause incompatibility.

1. Support can be enabled by the application for a designated controller through a manufacturer request command 9 (Options request) with bit 7 (Enable extended modem configuration) set. It will remain active until the application either releases the **COMMON-ISDN-API** or issues another options request with bit 7 not set. This is the recommended method.

2. Support can be enabled for the duration of a physical connection by setting bit 14 of the speed negotiation parameter in the B1 configuration of B1 protocol 7.

An application can determine whether the **COMMON-ISDN-API** supports extended modem configuration by examining the CAPI profile and searching the manufacturer string for "Eicon" or by examining the CAPI profile and trying the manufacturer command 9 as described below.

Release notes:

Changes since the first version from 9.2.2001:

- Introduced the bit *Disable async framer flush timer* in the *Extended options* word that enables an application to switch off the timer that flushes received data in the async rx framer not later than 100 ms after the first new character was received. This was a request in conjunction with the V.23 half duplex mode.

Changes since the second version from 21.2.2001:

- Added the bit *V.22 Diva® Fast Setup* in the *Enabled modulations mask* word and related values in the *connected norm* parameter of the CTS_ON and DCD_ON indication to be able to support these modulations. They are used in conjunction with point of sales (POS) terminals.

Changes since the third version from 10.8.2002:

V.23 HDX features have been extended by the following functionalities:

- Since 27.4.2002 it is allowed to set bit *V.23 according to ETS 300 659-2* (V.23 off-hook) and bit *V.23 according to ETS 300 659-1* (V.23 on-hook) of the *Enabled modulations mask* word at the same time to establish automoding. The behavior of the modulation is that it waits silently until one of the startup sequences is detected. Then it

enters the data state with this modulation, i.e. all data that need to be sent will be sent using this modulation and only frames with this modulation will be received. When the bit *Bypass protocol* in the *Extended options* word is set, the transition to data state will be indicated by a CTS ON and a DCD ON message as described in annex E.2.

- A new bit *Enable empty frames* has been added to the *Extended options* word. When this bit is set, it is allowed to issue data packets with length 0. They are sent to the line as V.23 frames with no data content. If a frame without data content is received, it will be indicated to the application as data packet with length 0. This feature might be used together with the automoding facility described above. In that case, an empty frame will be accepted in the process of determining the modulation used by the peer device.
- A bit *Enable multimoding* has been added to the *Extended options* word. If this bit is set, the first byte of every data packet is treated as modulation tag (refer to annex F). On a received packet it indicates in which norm this frame was modulated. For a packet that has to be sent, the modulation selected via its modulation tag byte will be used. This mode of operation might be used together with the Enable empty frames bit. Then, the **COMMON-ISDN-API** will indicate frames without data content as packets consisting of only the modulation tag byte. When both bits *V.23 according to ETS 300 659-2* and *V.23 according to ETS 300 659-1* are set, both type of frames are recognized and reported to the application.

Changes since the fourth version from 23.8.2002:

- Added support for automoding from V.22 FC to ITU-T modulations. A COMMON-ISDN-API application may just select B1 protocol 7, B2 protocol 7 and B3 protocol 7.
- Added extended parameter fields *Extended modem protocol configuration* and *SDLC modem protocol configuration* in the *B2 configuration* struct for more detailed control of the Modem protocol and to be able to pass the SDLC parameters that are required when automoding results in a V.22 Fast Setup connection with SDLC protocol.

Changes since the fifth version from 4.10.2002:

- Added the possibility to force SDLC modem operation for standard ITU-T modulations by setting bit 0 *disable V.42 / V.42 bis*, bit 1 *disable MNP4 / MNP5* and bit 2 *disable transparent mode* of the modem options at the same time.
- There are two separate bits to disable step-up and step-down.

Changes since the sixth version from 13.1.2003:

- Added the bit *Bell 202 (Caller ID)* in the *Enabled modulations mask* word and the related value in the *connected norm* parameter of the CTS_ON and DCD_ON indication. This modulation is used in some countries for caller ID transmission in the PSTN.

Changes since the seventh version from 13.1.2004:

- Added support for break signaling via annex *G.1 Break signaling requests* and *G.2 Break signaling indications*.
- Added the bits *V21, 10 bit/s* and *Bell 202 (POS)* in the *Enabled modulations mask* word and the related value in the *connected norm* parameter of the CTS_ON and DCD_ON indication. Bell 202 (POS) is used in some environments for point of sales transactions.

Changes since the eighth version from 13.7.2005:

- Included additional options for SDLC operation in the *SDLC options* field of the *SDLC modem configuration*. The option *single data packets* forces SDLC to send out every data packet individually with poll/final bit set. This is needed for interoperability with most POS terminals. *Reverse establishment* reverts the roles during link establishment. If set, the DCE sends SNRM. It's mandatory for operation with POS terminals. If *explicit data acknowledgement* is set every received data packet is acknowledged immediately by a RR frame. This is optional and may be useful in some applications. *Fast poll recovery* enables a workaround for a certain POS terminal where the loss of a frame with poll/final bit set must be recovered quickly to achieve interoperability, therefore its use for POS operation is recommended. If *initiate fast establishment* is set, a RR frame is sent out immediately instead of SNRM. To skip the SNRM/UA frames this way will result in a faster link establishment if the peer supports it.

Changes since the ninth version from 11.1.2007:

- Added support for the modulation Bell 103 SIA via the new bit *Bell 103 (SIA)* in the *enabled modulations mask* of the *extended modem configuration*. Multimoding operation is mandatory for this modulation. The modulation tag denotes the preamble type with each frame as defined in annex F *modulation tag in multimoding operation*.
- Added support for V.23 reverse via the new bit *V.23 reverse* in the *enabled modulations mask* of the *extended modem configuration*.

Changes since the tenth version from 4.12.2009:

- Added the bit *disconnect negotiation* in the *application options* field of the *extended modem protocol configuration*. If it is set the application may mark the connection as failed by asserting DISCONNECT_REQ prior to DISCONNECT_B3_REQ or DISCONNECT_B3_RESP. Precondition is that the application uses early B3 to avoid the immediate call release on peer hangup.
- Added more detailed modem training result reporting via the struct *Extended modem protocol result* in the NCPI of B3 protocol 7 *Modem*.
- Added support for packet state notifications that tell the application when data reception started and if receive data has been discarded.

- Added the parameters *Answer tone duration*, *Carrier wait time*, *Carrier loss time* and *V.29FC answer tone duration* in the *Extended modem options* of the B1 configuration of B1 protocol 7 *Modem*.
- Added support for bit transparent modem mode via the bit *Bit transparent mode* in the *V.34 options* of the *Extended modem configuration* of the B1 configuration of B1 protocol 7 *Modem*.
- Added the bit *Enable extended echo canceller* in the *V.34 options* of the *Extended modem configuration* of the B1 configuration of B1 protocol 7 *Modem*.

Changes since the eleventh version from 29.6.2010:

- Described 4096 byte frame support for SDLC.
- Added support for modem modes V.23 switched carrier, RB2000 and eCall via bits in the *Enabled modulations mask* in the *Extended modem configuration* and codes in the *Connected norm* field of the *Extended modem protocol result*.
- Added a *Raw result code* in the *Extended modem protocol result* as disconnect reason for the modem connection and a *Protocol type* field to identify the error correction protocol, compression and transport layer used for the modem connection.
- Added a *Fast Poll Retry Timer* option in the *SDLC options2* field of the *SDLC modem configuration*. When not set, a slower timer (7 seconds) is used to recover from a lost RR poll. The slower retry option is required for some POS terminals.
- Added *Max Garbage Bytes During Flags* field to the *Extended Modem Protocol configuration*. This provides the capability to specify how many non-flag bytes are allowed while receiving HDLC flags. Some POS terminals send more garbage bytes than others during the early part of training. This can be used to prevent unwanted fallback to asynchronous connection mode if the terminal requires SDLC.
- Added *Fast Fallback To Transparent* option to the *Extended Negotiation Options* field in the *Extended Modem Configuration*. For incoming calls (answerer), this option allows a quicker fallback to asynchronous mode if no data is received during error-detection (V.42) detection phase. This option is useful to cut about 2 seconds off the connection establishment time when the remote terminal is connecting asynchronously.
- Added the parameter *Answer Tone Delay* in the *Extended modem options* of the *Extended Modem Configuration*. This delay is the time to wait between going off hook to the start of the answer tone.
- Added *Max Time in Detection Phase* field to the *Extended Modem Protocol configuration*. This provides the capability to specify how long (in milliseconds) to wait for HDLC flags before falling back to transparent. This allows for shortening of the call set up time for asynchronous calls.

Changes since the twelveth version from October 2013:

- Added a *Transmit Turnaround Delay* bit in the *SDLC options2* field of the *SDLC modem configuration*. When set, a transmit delay of both RR polls and I-frames (120ms) is introduced for HDX, FC modulations (V.27FC/V.29FC), on turnaround receive to transmit. The delay is required for some POS terminals.

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]...[6]: reserved [7]: Extended modem configuration supported [8]...[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 MANUFACTURER 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

Manufacturer Command

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..6]: reserved, must be set to 0 [Bit 7]: Enable extended modem configuration [Bit 8..31]: reserved, must be set to 0

This information element appears in:

Manufacturer Command

Protocol-dependent parameters

B1 Configuration (struct)

The purpose of the sub-parameter *B1 configuration* is to provide additional configuration information for the B1 protocol.

The coding of the parameter *B1 configuration* for each protocol is described below:

B1 Configuration for B1 protocol 7: Modem with full negotiation:

word	maximum bit rate	coded as unsigned integer value, default: adaptive
word	bits per character	coded as unsigned integer value, default: 8
word	parity	0: none, 1: odd, 2: even (default: no parity)
word	stop bits	0: 1 stop bit, 1: 2 stop bit (default: 1 stop bit)
word	options	[Bit 0]: disable retrain [Bit 1]: disable ring tone [Bits 3...2]: guard tone: 00: no guard tone (default) 01:1800hz 10: 550hz [Bits 5...4]: loudspeaker 00: off 01: on during dialing and negotiation (default) 10: always on [Bits 7...6]: loudspeaker volume 00: silent 01: normal low (default) 10: normal high 11: maximum
byte	speed negotiation	0: none, 1: within modulation class, 2: V.100, 3: V.8 (default) Note: The highest implemented negotiation mode is used as default.
byte	proprietary options	proprietary options that are valid for the scope of this B-protocol configuration: [Bit 6]: Enable extended modem configuration
struct	Extended modem configuration	Extended configuration settings for standard data modem

Extended modem configuration:

dword	Extended options	Extended modem options: [Bit 0] : Leased line mode [Bit 1] : 4-wire operation [Bit 2] : Disable disconnect on busy tone [Bit 3] : Disable calling tone [Bit 4] : Disable answer tone [Bit 5] : Enable dial tone detection [Bit 6..7] : reserved [Bit 8] : Disable retrain [Bit 9] : Disable step-down [Bit 10] : Disable split speed [Bit 11] : Enable short answer tone [Bit 12] : Allow RDL test loop [Bit 13] : Disable step-up [Bit 14] : Disable async framer flush timer [Bit 15] : reserved [Bit 16] : Enable empty frames [Bit 17] : Enable multimoding [Bit 18] : reserved [Bit 19] : Norm select modifier [Bit 20..30] : reserved [Bit 31] : Bypass protocol
dword	Disabled modulations mask	Disabled automode modulations: [Bit 0] : Disable V.21 [Bit 1] : Disable V.23 [Bit 2] : Disable V.22 [Bit 3] : Disable V.22 bis [Bit 4] : Disable V.32 [Bit 5] : Disable V.32 bis [Bit 6] : Disable V.34 [Bit 7] : Disable V.90 DPCM [Bit 8] : Disable Bell 103 [Bit 9] : Disable Bell 212 A [Bit 10] : Disable V.FC [Bit 11] : Disable K56 flex [Bit 12] : Disable X.2 [Bit 13..31] : reserved
dword	Enabled modulations mask	Enabled modulations: [Bit 0] : V.29 FDX [Bit 1] : V.33 [Bit 2] : V.90A [Bit 3] : V.22 Diva® Fast Setup [Bit 4] : reserved for V.22 bis Diva Fast Setup [Bit 5] : reserved for V.29 Diva Fast Setup [Bit 6..8] : reserved [Bit 9] : V.23 according to ETS 300 659-2 [Bit 10] : V.23 according to ETS 300 659-1 [Bit 11] : V.23 switched carrier [Bit 12] : Bell 202 (Caller ID) [Bit 13] : V.21, 10 bit/s [Bit 14] : Bell 202 (POS) [Bit 15] : Bell 103 (SIA) [Bit 16] : V.23 reverse [Bit 17] : RB2000 (RB2000E if *Extended Options* [Bit 19] set) [Bit 18..28] : reserved [Bit 29] : eCall [Bit 30..31] : reserved
word	Minimum transmit speed	Minimum transmit speed coded as unsigned integer Value 0 will set the default
word	Maximum transmit speed	Maximum transmit speed coded as unsigned integer Value 0 will set the default
word	Minimum receive speed	Minimum receive speed coded as unsigned integer Value 0 will set the default
word	Maximum receive speed	Maximum receive speed coded as unsigned integer Value 0 will set the default
word	Transmit level adjust	Transmit level in dBm, coded as 2-s complement signed integer. Valid range: -1..-15 dBm Value 0 will set the default

word	V.34 Options	Specific V.34 options: [Bit 0] : Disable transmit level reduction [Bit 1] : Disable pre-coding [Bit 2] : Disable pre-emphasis [Bit 3] : Disable shaping [Bit 4] : Disable non-linear encoding [Bit 5] : Disable manual reduction [Bit 6] : Disable 16 point training [Bit 7] : reserved [Bit 8] : Disable symbol rate 2400 [Bit 9] : Disable symbol rate 2743 [Bit 10] : Disable symbol rate 2800 [Bit 11] : Disable symbol rate 3000 [Bit 12] : Disable symbol rate 3200 [Bit 13] : Disable symbol rate 3429 [Bit 14] : Bit transparent mode [Bit 15] : Enable extended echo canceller
word	reserved	Must be coded as 0.
word	Answer tone duration	Duration of the answer tone in milliseconds. Value 0 will set the default.
word	Carrier wait time	Max wait time until carrier detection in milliseconds. Value 0 will set the default.
word	Carrier loss time	Max carrier loss time until disconnect in milliseconds. Value 0 will set the default.
word	V.29FC answer tone duration	Duration of the V.29FC answer tone in milliseconds. Value 0 will set the default.
word	Answer tone delay	Delay of the answer tone in milliseconds. Value 0 will set the default.

Note: If bit 15 *Bell 103 (SIA)* is set in the *enabled modulations mask*, bit *14 disable async framer flush timer* and bit 17 *enable multimoding* must be set in the *extended options*.
Note: In eCall mode every data frame is prefixed by one byte denoting its length. Each data block of DATA_B3_REQ / DATA_B3_IND may contain several such frames with prefixed length byte. An empty frame consisting of only the length byte set to 0 passed to the COMMON-ISDN-API controller starts sending in eCall mode. Reception of the eCall ACK signal is indicated by the COMMON-ISDN-API controller as empty frame consisting only of the length byte set to 0.

B2 Configuration (struct)

The purpose of the sub-parameter *B2 configuration* is to provide additional configuration information for the B2 protocol.

The coding of the parameter *B2 configuration* for each protocol is described below:

B2 Configuration for B2 protocol 7: Modem with full negotiation:

word	options	[Bit 0]: disable V.42 / V.42 *bis* [Bit 1]: disable MNP4/MNP5 [Bit 2]: disable transparent mode (accept only V.42 / V.42 *bis* or MNP4/5 connects) [Bit 3]: disable V.42 negotiation [Bit 4]: disable compression [other]: reserved
struct	Extended modem protocol configuration	
struct	SDLC modem protocol configuration	

Note: If bit 0 *disable V.42 / V.42 bis*, bit 1 *disable MNP4 / MNP5* and bit 2 *disable transparent mode* are set at the same time, SDLC will be taken as error correction protocol.
Note: In SDLC mode frame sizes up to 4096 bytes are supported via the *More-data bit* in the *Flags* word of DATA_B3_REQ and DATA_B3_IND. If the application registered with *maxBDataLen* set to 2048 the COMMON-ISDN-API controller indicates frames up to 4096 bytes as fragments with the *More-data bit* of DATA_B3_IND set in all but the last fragment.

Extended modem protocol configuration:

byte	Extended negotiation options	Extended modem negotiation options: [Bit 0..4] : reserved [Bit 5] : require protocol if V.34 or above [Bit 6] : disable SDLC [Bit 7] : Fast Fallback To Transparent For incoming calls (answerer), this option allows a quicker fallback to asynchronous mode if no data is received during error-detection (V.42) detection phase.
byte	Extended protocol options	Extended modem protocol options: [Bit 0] : no protocol if 1200 Bit/s [Bit 1] : flush receive data immediately [Bit 2] : disable V.42 selective reject [Bit 3] : disable MNP 3 [Bit 4] : disable MNP 4 [Bit 5] : disable MNP 10 [Bit 6] : no protocol if V.22 bis [Bit 7] : no protocol if V.32 bis
byte	Break configuration	[Bit 1..0] : 0 : break disabled 1 : break normal 2 : break expedited 3 : break destructive [Bit 2] : enable async HDLC transport [Bit 3] : enable PACK8 transport [Bit 4..7] : reserved
byte	Application options	[Bit 0] : early connect [Bit 1] : pass indications [Bit 2] : disconnect negotiation [Bit 3..7] : reserved
byte	Max Garbage Bytes During Flags	Maximum number of garbage bytes allowed during receiving of synchronous training flags before falling back to Asynchronous connection. If not set, a default of 10 bytes is used.
word	Max Time In Detection Phase	Maximum number of milliseconds to wait for synchronous training flags. This value has a resolution of 100 ms and is rounded up if needed.

SDLC modem configuration:

byte	Address A	link address (default is 0x30)
byte	Address B	reserved, coded as 0
byte	Modulo Mode	• 8 - normal operation (default) • 128 - extended operation
byte	Window Size	window size (default: 7)
struct	XID	contents of the XID response when a XID command is received
byte	SDLC options	[Bit 0-2] : reserved [Bit 3] : single data packets [Bit 4] : reverse establishment [Bit 5] : explicit data acknowledgement [Bit 6] : fast poll recovery [Bit 7] : initiate fast establishment
byte	SDLC options2	[Bit 0] : reserved [Bit 1] : Fast Poll Retry Timer When set, a faster timer (750ms) is used to recover from a lost RR poll and in turn resend an RR. [Bit 2] : Transmit Turnaround Delay (HDX connected norm) When set, a transmit delay of both RR polls and I-frames (120ms) is introduced for HDX, FC modulations (V.27FC/V.29FC), on turnaround receive to transmit. [Bit 3..7] : reserved

NCPI (struct)

The purpose of the parameter *NCPI* is to provide additional protocol-specific information.

NCPI for B3 protocol 7: Modem (messages CONNECT_B3_ACTIVE_IND, DISCONNECT_B3_IND):

word	rate	Actual bit rate used, coded as unsigned integer value. If receive and transmit rates are different the lower rate is displayed.
word	protocol	result of negotiation [Bit 0]: negotiation results in V.42 / V.42 *bis* [Bit 1]: negotiation results in MNP4/MNP5 [Bit 2]: negotiation results in transparent mode [Bit 3]: reserved [Bit 4]: negotiation results in compression [other]: reserved
struct	Extended modem protocol result	

Note: If none of the bits 0, 1 and 2 is set, a modem connection was established with SDLC protocol.

Extended modem protocol result:

byte	Raw result code	0: Success 1: Busy tone 2: Congestion tone 3: Incompatibility 4: Cleardown 5: Training timeout 6: No carrier 7: Carrier loss 8: Remote hangup 9: Frame reject 10: V.42 bis inconsistency 11: Fatal layer 2 error 12: Fatal datapump error 13: No calling tone 14: No answer 15: No dial tone 16: No second dial tone 17: No silence 18: No PABX tone 19: No bong tone 20: Parallel pick up 21: Invalidated by application 22: No answer to establishment 23: No answer to polling 24: Too many retries sending 25: Too many retries receiving 26: Too many retransmissions sending 27: Too many retransmissions receiving
byte	reserved	

byte	Protocol type	[Bit 4..0] : Protocol 0: Bit transparent 1: Async 4: MNP2 5: MNP3 6: MNP4 7: V.42 8: SDLC 9: X.75 16: MNP4 / MNP5 17: V.42 / V.42 bis 18: V.42 / V.44 [Bit 7..5] : Transport 0: none 1: Async HDLC 2: PACK8
byte	Connected norm	Connected norm 0: unspecified 1: V.21 2: V.23 3: V.22 4: V.22 bis 5: V.32 bis 6: V.34 7: reserved 8: Bell 212A 9: Bell 103 10: V.29 leased line 11: V.33 leased line 12: V.90 13..17: reserved 18: V.32 19: K56 flex 20: X.2 20..38: reserved 39: V.23 according to ETS 300 659-2 40: V.23 according to ETS 300 659-1 41: V.23 switched carrier 42: Bell 202 (Caller ID) 43: V.21, 10 bit/s 44: Bell 202 (POS) 45: Bell 103 (SIA) 46: V.23 reverse 47: RB2000 / (RB2000E if *Extended Options* [Bit 19] set) 48..58: reserved 59: eCall 60..71: reserved 72: V.22 Diva® Fast Setup 73: reserved for V.22 bis Diva Fast Setup 74: reserved for V.29 Diva Fast Setup
word	reserved	
word	reserved	
word	reserved	
word	Roundtrip delay	Roundtrip delay in milliseconds Coded as 0 if not available
dword	Connected speed tx	Connected speed of transmit direction in Bit/s
dword	Connected speed rx	Connected speed of receive direction in Bit/s
word	Secondary channel speed tx	Secondary channel speed of transmit direction in Bit/s Coded as 0 if not applicable
word	Secondary channel speed rx	Secondary channel speed of receive direction in Bit/s Coded as 0 if not applicable
word	Symbol rate	Symbol rate in symbols per second
byte	Receive level	Receive signal level in dBm as signed value
byte	Echo level	Echo signal level in dBm as signed value
byte	Signal to noise ratio	Signal to noise ratio in dB
byte	Signal quality	Mean absolute error that indicates the signal quality
byte	Local retrain counter	
byte	Remote retrain counter	
byte	Local resync counter	
byte	Remote resync counter	

NCPI for B3 protocol 7: Modem (messages except CONNECT_B3_ACTIVE_IND, DISCONNECT_B3_IND):

coded as an empty struct

E.2 Control Messages: Indications

When the bit *Bypass protocol* is set in the *Extended options* word, DATA_B3_IND messages with break bit (bit position 4) set in the flags field are used to signal indications from the B1 protocol modem.
The following indications are defined:

Modem DCD OFF indication

Indication that signals carrier loss for carrier mode modulations and modulation norm changes for carrierless modulations.

byte	indication	0x01
word	time stamp	reserved

Modem DCD ON indication

Indication that signals carrier detect.

byte	indication	0x02
word	time stamp	reserved
byte	connected norm	Connected norm. For coding see parameter *connected norm* of *extended modem protocol result*.
word	connected options	reserved
dword	connected speed	Maximum of transmit and receive speed in bit/s
word	round trip delay	Round trip delay in milliseconds
dword	connected transmit speed	Transmit speed of the connection in bit/s
dword	connected receive speed	Receive speed of the connection in bit/s

Modem CTS OFF indication

Indication that signals clear to send off. For V.23 HDX modes this indication is issued at the same time as the DCD OFF indication. It might be ignored.

byte	indication	0x03
word	time stamp	reserved

Modem CTS ON indication

Indication that signals clear to send. For V.23 HDX modes this indication is issued at the same time as the DCD ON indication. It might be ignored.

byte	indication	0x04
word	time stamp	reserved
byte	connected norm	Connected norm. For coding see parameter *connected norm* of *extended modem protocol result*.
word	connected options	reserved
dword	connected speed	Maximum of transmit and receive speed in bit/s
word	round trip delay	Round trip delay in milliseconds
dword	connected transmit speed	Transmit speed of the connection in bit/s

dword	connected receive speed	Receive speed of the connection in bit/s

F Modulation tag in multimoding operation

If multimoding operation is selected via the bit *Enable multimoding* in the *Extended options* word, the first byte of every data packet is treated as modulation tag. On a received packet it indicates in which norm this frame was modulated and with which preamble. A packet that has to be sent, uses the modulation and preamble selected via its modulation tag byte. The frame content is represented by the second until n-th byte where n is the length of the packet and thus n-1 the length of the data content of the frame.

byte	modulation tag	Connected norm and preamble type 0: unspecified 1: V.21 2: V.23 3: V.22 4: V.22 bis 5: V.32 bis 6: V.34 7: reserved 8: Bell 212A 9: Bell 103 10: V.29 leased line 11: V.33 leased line 12: V.90 13..17: reserved 18: V.32 19: K56 flex 20: X.2 20..38: reserved 39: V.23 according to ETS 300 659-2 40: V.23 according to ETS 300 659-1 41: V.23 switched carrier 42: Bell 202 (Caller ID) 43: V.21, 10 bit/s 44: Bell 202 (POS) 45: Bell 103 (SIA) 46..71: reserved 72: V.22 Diva® Fast Setup 73: reserved for V.22 bis Diva Fast Setup 74: reserved for V.29 Diva Fast Setup 75..111: reserved 112: Bell 103 (SIA) negative acknowledgement 113: Bell 103 (SIA) positive acknowledgement 114: Bell 103 (SIA) speed synchronization 300 Bit/s 115: Bell 103 (SIA) speed synchronization 110 Bit/s 116: Bell 103 (SIA) immediate 117: Bell 103 (SIA) exit from standby 118: Bell 103 (SIA) response timeout
byte array	data	data content of frame

Note: *modulation tags* 112..118 apply only for modulation Bell 103 (SIA) which is selected via bit 15 in the *enabled modulations mask*. They denote the preamble type with every data frame. *modulation tag* 118: *Bell 103 (SIA) response timeout* doesn't contain data and is not applicable to requests. It indicates a timeout if no carrier was received when a peer acknowledgement or data block was expected. After the first timeout the COMMON-ISDN-API controller reports this indication in regular intervals until peer carrier has been detected again.

G.1 Break signaling requests

DATA_B3_REQ messages with UI frames bit (bit position 4) set in the flags field are used to control the break state.
The following requests are defined:

Modem request set break

Request that starts sending break to the remote modem.

byte	request	0x0a
byte	break option	0 : break disabled 1 : break normal 2 : break expedited 3 : break destructive
word	break duration	break duration in milliseconds

Modem request clear break

Request that stops sending break to the remote modem.

byte	request	0x0b

G.2 Break signaling indications

When the *Break configuration* is set not equal to *break disabled*, DATA_B3_IND messages with break bit (bit position 4) set in the flags field are used to signal the break state.
The following indications are defined:

Modem indication break set

Indication that signals the start of a break from the remote modem.

byte	indication	0x0a

Modem indication break cleared

Indication that signals the end of a break from the remote modem.

byte	indication	0x0b

H.1 Packet state request

A DATA_B3_REQ message with UI frames bit (bit position 4) set in the flags field is used to subscribe for packet state notifications.

Request notify packet state

Request that subscribes for packet state notifications.

byte	request	0x1f

byte	packet state flags	[Bit 0]: Enable packet state notifications [Bit 7..1]: reserved

H.2 Packet state indication

If the COMMON-ISDN-API application subscribed for packet state notifications a DATA_B3_IND message with break bit (bit position 4) set in the flags field is used to signal the packet state.

Modem indication packet state

Indication that signals the state of a data packet that is being received.

byte	indication	0x1f
byte	packet state	0..2: reserved 3: Aborted HDLC data 4: Wrong CRC HDLC data 5: reserved 6: Data start 7..255: reserved