COMMON-ISDN-API

Version 2.0

CAPI Extensions
for PrimuX Adapters

June 2006

Contents

1   MESSAGE DESCRIPTIONS

1.1   MANUFACTURER_REQ

Description

This message is used to handle optional request on the *controller* or requests related to connections identified by *PLCI* or *NCCI*. The struct *manufacturer request parameters* is defined for each request.

MANUFACTURER_REQ	Command	0xFF
	Subcommand	0x80

Parameter	Type	Comment
Controller/PLCI/NCCI	dword	Depending on request selector
ManufacturerID	dword	0x00474147
Request selector	word	0x0011: D-Channel Access 0x0012: Audio Control 0x0013: Tone generator 0x0015: Layer 1 Access 0x0016: Crossbar programming 0x0017: Read hardware status 0x0018: Enable/disable state information 0x0019: Enable/disable reconfig notification
Manufacturer request parameter	struct	Request dependent parameters

Note

Every request is valid only with one of *Controller/PLCI/NCCI*. Check the description of the different request selectors to find out which value to use.

1.2   MANUFACTURER_CONF

Description

This message confirms the acceptance of the **MANFACTURER_REQ**. The event is identified by *Controller/PLCI/NCCI*, depending on the request. The struct *manufacturer confirmation parameters* is defined for every request. Any error is coded in the parameter *info*.

MANUFACTURER_CONF		Command	0xFF
		Subcommand	0x81

Parameter	Type	Comment
Controller/PLCI/NCCI	dword	Depending on request selector
ManufacturerID	dword	0x00474147
Info	word	**0:** request accepted **0x2001:** message not supported in current state **0x2002:** incorrect Controller/PLCI/NCCI **0x2007:** illegal message parameter coding **0x300B:** request not supported
Request selector	word	0x0011: D-Channel Access 0x0012: Audio Control 0x0013: Tone generator 0x0015: Layer 1 Access 0x0016: Crossbar programming 0x0017: Read hardware status 0x0018: Enable/disable state information 0x0019: Enable/disable reconfig notification
Manufacturer confir-mation parameter	struct	Request dependent parameters

1.3 MANUFACTURER_IND

Description

This message is used to indicate a request dependent event originating from a controller or connections identified via *Controller/PLCI/NCCI*, depending on the request. The struct *manufacturer indication parameter* is defined for every request.

MANUFACTURER_IND	Command	0xFF
	Subcommand	0x82

Parameter	Type	Comment
Controller/PLCI/NCCI	dword	Depending on request selector
ManufacturerID	dword	0x00474147
Request selector	word	0x0011: D-Channel Access 0x0012: Audio Control 0x0013: Tone generator 0x0015: Layer 1 Access 0x0016: Crossbar programming 0x0017: Read hardware status 0x0018: State information 0x0019: Reconfig notification
Manufacturer indication parameter	struct	Request dependent parameters

1.4   MANUFACTURER_RESP

Description

With this message the application confirms receipt of a request indication message. The struct *manufacturer response parameters* is defined for each request.

MANUFACTURER_RESP	Command	0xFF
	Subcommand	0x83

Parameter	Type	Comment
Controller/PLCI/NCCI	dword	Depending on request selector
ManufacturerID	dword	0x00474147
Request selector	word	0x0011: D-Channel Access 0x0012: Audio Control 0x0013: Tone generator 0x0015: Layer 1 Access 0x0016: Crossbar programming 0x0017: Read hardware status 0x0018: State information 0x0019: Reconfig notification
Manufacturer response parameter	struct	Request dependent parameters

2   PARAMETER DESCRIPTIONS

B Channel Information (struct)

The purpose of the sub-parameter *B channel information* is to choose between B channel data exchange, D channel data exchange or pure user-user data exchange. If this struct is empty, the default value is assumed.

This sub-parameter is coded as a structure. Depending on the parameter *Channel* (the first element of the structure), additional information is included. Parameter *Channel* can have the following values:

0:	**Use B channel**
1:	**Use D channel**
2:	**Use neither B channel nor D channel**
3:	**Use channel allocation (leased lines only)**
4:	**Use channel identification information element**
5:	**Broadband Extension: see COMMON-ISDN-API Part V**
6:	**Broadband Extension: see COMMON-ISDN-API Part V**
128:	**Use Handset**
129:	**Direct B channel access**

The struct *B channel information* is coded as follows:

0,1,2: Use B channel; use D channel; use neither B channel nor D channel; use Handset

Channel	Word	0: Use B channel (default value) 1: Use D channel 2: Use neither B channel nor D channel 128: Use Handset

3: Use channel allocation (leased lines only):

Channel	word	3: Use channel allocation (leased lines only)
Operation	word	0: DTE (originate) mode (default value) 1: DCE (answer) mode

Channel mask array	byte array[31]	0: D Channel mask (default value: 0)
		        BRI (16 kbit/s):
		           bits 6-7 are used
		           bits 0-5 are reserved
		        PRI (64 kbit/s):
		           bits 0-7 are used
		1: B channel 1 mask (default : 255)
		2: B channel 2 mask (default : 0)
		3…30: B channel 3...30 mask ignored in case of BRI
		        (default value: 0)

The parameter *Operation* defines the mode (DTE or DCE) in which the B-channel protocols (e.g. X.75 or X.25, etc.) are operated. The *Channel mask array* specifies the channels and subchannels to be bundled to one physical connection. In each mask byte, the least significant bit (LSB) corresponds to the LSB of the respective channel on the BRI or PRI. Bandwidth values may be selected within the range 0..64 kbit/s in units of 8 kbit/s. The default value for this mask array is {0, 255, 0, 0, …, 0}, thus allocating B Channel 1 with 64 kbit/s on a BRI. In the case of a BRI, the unused *channel mask array* bytes 3..30 shall be ignored. See the example below for different channel allocations:
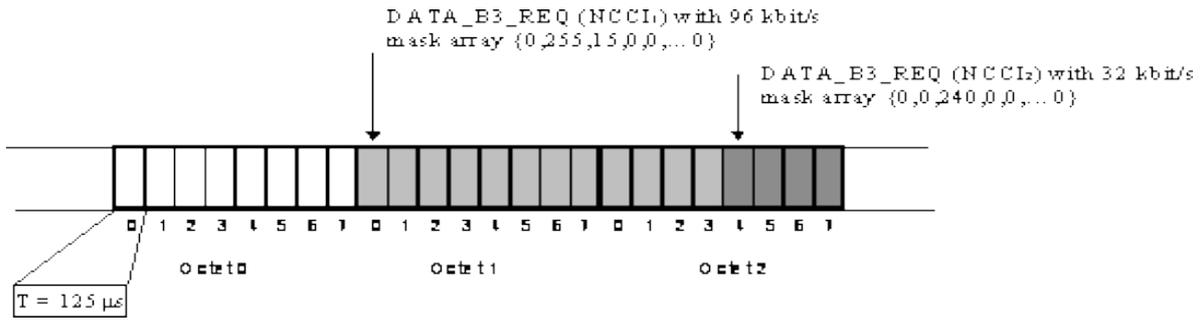
Two connections with different bandwidths (96 kbit/s and 32 kbit/s)

A leased line connection is always initiated by a CONNECT_REQ. Unused parameters (e.g. Called Party Number) are ignored. The message flow is as described in Annex A, A.1.1 Outgoing call.

The message CONNECT_CONF with *Info* value 0x300E indicates overlapping channel masks (such as {0,255,15,0,...} and {0,0,255,0,…}) in different CONNECT_REQ messages.

Channel allocation can be used on leased lines only.

4: Use channel identification information element:

Channel	word	4: Use channel identification information element
Channel Identification	struct	Coded in accordance with ETS 300 102-1 / Q.931

The purpose of the parameter *Channel Identification* is to identify a channel within the interface(s) controlled by these signaling procedures.

129: Direct B channel access:

Channel	word	4: Use channel identification information element
Channel Identification	struct	Coded in accordance with ETS 300 102-1 / Q.931

The purpose of the parameter *Channel Identification* is to identify a channel within the interface(s) controlled by these signaling procedures.

This sub-parameter appears in the parameter:

     Additional information

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):**

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..243: Reserved 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..n: Reserved
Tone duration	word	Function 1 (Start DTMF listen): Time in ms for one digit, default is 40ms Function 3 (Send DTMF digits): Time in ms for one digit, default is 40ms Function 4 (Start DTMF listen – rising and falling edge): Time in ms for one digit, default is 40ms All other functions: reserved, must be set to 0 if present
Gap duration	word	Function 1 (Start DTMF listen): Time in ms for one digit, default is 40ms Function 3 (Send DTMF digits): Time in ms for one digit, default is 40ms Function 4 (Start DTMF listen – rising and falling edge): Time in ms for one digit, default is 40ms All other functions: reserved, must be set to 0 if present
Send tone codes	struct	Function 3 (Send DTMF digits): Characters to be sent, coded as IA5 char '0' to '9', '*', '#', 'A', 'B', 'C' or 'D'. Each character generates a unique DTMF signal.
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 set to 0 if present

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):

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):

Detected tone codes	byte array	DTMF listen active: Received characters, coded as IA5 char. '0' to '9', '*', '#', 'A', 'B', 'C', 'D' or 'X': Recognition of fax tone CNG (1.1 kHz) 'Y': Recognition of fax tone CED (2.1 kHz) DTMF listen active – rising and falling edge: 0x7E: recognition of falling edge of DTMF / fax tone Tone detector active: 0x80: End of signal detected 0x82: Dial tone detected 0x83: PABX internal dial tone detected 0x86: Ringing tone detected 0x88: Busy tone detected 0x89: Congestion tone (reorder tone) detected Dial pulse listen active: 0xE0: Dial pulse digit '1' detected 0xE1: Dial pulse digit '2' detected 0xE2: Dial pulse digit '3' detected 0xE3: Dial pulse digit '4' detected 0xE4: Dial pulse digit '5' detected 0xE5: Dial pulse digit '6' detected 0xE6: Dial pulse digit '7' detected 0xE7: Dial pulse digit '8' detected 0xE8: Dial pulse digit '9' detected 0xE9: Dial pulse digit '0' detected

Note:
Detected tone code 0x80 (End of signal) 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 response 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):**

This information element appears in:

    FACILITY_RESP

Request Selector (word)

The purpose of the parameter *Request Selector* is to identify the requested COMMON-ISDN-API manufacturer specific request.

The following values are defined:

0x0011:	**D-Channel Access (Valid with Controller/PLCI)**
0x0012:	**Audio Control (Valid with Controller/PLCI)**
0x0013:	**Tone generator (Valid with Controller/PLCI/NCCI)**
0x0014:	**Tone generator with volume setting (Valid with NCCI)**
0x0015:	**Layer 1 Access (Valid with Controller)**
0x0016:	**Crossbar programming (Valid with Controller)**
0x0017:	**Read hardware status (Valid with Controller)**
0x0018:	**Enable/disable state information (Valid with Controller)**
0x0019:	**Enable/disable reconfig notification**

This information element appears in:

MANUFACTURER_REQ
MANUFACTURER_CONF
MANUFACTURER_IND
MANUFACTURER_RESP

	Manufacturer Request Parameter (struct)

The purpose of the parameter *Manufacturer Request Parameter* is to offer additional information concerning the message MANUFACTURER_REQ.

This parameter is coded depending on the *Request Selector* as a structure with the following elements:

Request selector:

0x0011:   D-Channel Access (Valid with Controller/PLCI)

Function	word	0x0001: D-Channel Listen Request 0x0002: D-Channel Data Request 0x0003: Send SETUP ACK (valid with PLCI) 0x0004: Send CALL PROCEEDING (valid with PLCI)
ListenFlag (used only for function 0x0001; set to 0 for all others)	word	0: D-Channel listen inactive 1: D-Channel listen active
Data (used only for function 0x0002; set to empty struct for all others)	struct	Data to send on D-Channel (complete HDLC packet if used with Controller; if used with PLCI a valid LAPD and DSS1/1TR6 header will be prepended, i.e. the data has to start with the respective DSS1/1TR6 message byte)

0x0012:   Audio Control (Valid with Controller/PLCI)

Function	word	0x0001: Set speaker volume (Valid with Controller) 0x0002: Set microphone gain (Valid with Controller) 0x0003: Set mute flag (Valid with Controller) 0x0004: Connect to handset (Valid with PLCI) 0x0005: Enable/disable AGC (Valid with PLCI/NCCI)
Parameter	word	Volume/Gain: 0 (off) to 1023 (max) Mute: 0 (Microphone active), 1 (Microphone disabled) Connect: 0 (Connect to PC), 1 (Connect to handset) AGC: 0 (Disable), 1 (Enable)

0x0013:   Tone generator (Valid with Controller/PLCI/NCCI)

Frequency1	word	Frequency of first tone component
Frequency2	word	Frequency of second tone component
Duration	struct	Duration of signal. Each byte specifies a duration in 10ms increments. The first byte specifies On-Time, the second byte Off-Time and so on. This structure is repeated until a new manufacturer request changes it.An empty structure disables the tone generator. The tone generator has precedence over the DTMF generator and normal DATA_B3 message flow. When used with NCCI the tone generator is implemented in software and works with all supported adapters. Tone generation on Controller or PLCI is hardware dependent

0x0014:   Tone generator with volume setting (Valid with NCCI)

Frequency1	word	Frequency of first tone component
Frequency2	word	Frequency of second tone component
Volume	Word	0-15: Attenuation in dB 16-65535: reserved

Duration	struct	Duration of signal. Each byte specifies a duration in 10ms increments. The first byte specifies On-Time, the second byte Off-Time and so on. This structure is repeated until a new manufacturer request changes it.An empty structure disables the tone generator. The tone generator has precedence over the DTMF generator and normal DATA_B3 message flow. When used with NCCI the tone generator is implemented in software and works with all supported adapters. Tone generation on Controller or PLCI is hardware dependent

0x0015:   Layer 1 access (Valid with Controller)

Function	word	0x0001: Physical layer Listen Request 0x0002: Physical layer Data Request
ListenFlag (used only for function 0x0001; set to 0 for all others)	word	0: Physical layer listen inactive 1: Physical layer listen active
Data (used only for function 0x0002; set to empty struct for all others)	struct	Data to send on Physical layer

0x0016:   Crossbar Programming (Valid with Controller)

Function	word	0x0000: Crossbar off 0x0001: Crossbar on
Channel 1	byte	First channel to connect
Channel 2	Byte	Second channel to connect. This function connect the specified B channels directly in hardware (supported by PowerISDN PCI and Primux). Valid channel numbers are 1, 2 for PowerISDN PCI and 0-63 for Primux.

0x0017:   Read hardware status (Valid with Controller)

0x0018:   Enable/disable state information (Valid with Controller)

Function	word	0x0000: Disable state information 0x0001: Enable state information

0x0019:   Enable/disable reconfig notification

Function	word	0x0000: Disable notifications 0x0001: Enable notifications

This information element appears in:

MANUFACTURER_REQ

	Manufacturer Confirmation Parameter (struct)

The purpose of the parameter *Manufacturer Confirmation Parameter* is to offer additional information concerning the message MANUFACTURER_CONF.

This parameter is coded depending on the *Request Selector* as a structure with the following elements:

Request selector:

0x0011:   **D-Channel Access (Valid with Controller/PLCI)**

Result	Word	0x0000: Action initiated other: Error code

0x0012:   **Audio Control (Valid with Controller/PLCI)**

Result	Word	0x0000: Action initiated 0x0001: NCCIs exist on PLCI (no handset connect possible) 0x0002: Handset in use (no handset connect possible)

0x0013:   **Tone generator (Valid with Controller/PLCI/NCCI)**

Result	Word	0x0000: Action initiated other: Error code

0x0014:   **Tone generator with volume setting (Valid with Controller/NCCI)**

Result	Word	0x0000: Action initiated other: Error code

0x0015:   **Layer 1 access (Valid with Controller)**

Result	Word	0x0000: Action initiated other: Error code

0x0016:   **Crossbar Programming (Valid with Controller)**

Result	Word	0x0000: Action initiated other: Error code

0x0017:   **Read hardware status (Valid with Controller)**

Result	struct	Hardware specific information
		PrimuX S2M adapters return:
		   byte FALC activation status
		   word FALC FEC register
		   word FALC CVC register
		   word FALC EBC register
		   word FALC CEC1 register
		   word FALC CEC2 register
		   word FALC CEC3 register
		   byte 1 if FALC interrupt occurred after last read
		   byte Number of SABME messages sent

0x0018:   **Enable/disable state information (Valid with Controller)**

Result	Word	0x0000: Action initiated other: Error code

0x0019:   **Enable/disable reconfig notification**

Result	Word	0x0000: Action initiated other: Error code

This information element appears in:

MANUFACTURER_CONF

| | | Manufacturer Indication Parameter (struct) |

The purpose of the parameter *Manufacturer Indication Parameter* is to offer additional information concerning the message MANUFACTURER_IND.

This parameter is coded depending on the *Request Selector* as a structure with the following elements:

Request selector:

0x0011: **D-Channel Access (Valid with Controller/PLCI)**

| Data | struct | Data from D-Channel |

0x0012: **Audio Control (Valid with Controller/PLCI)**
Parameter does not apply (coded as structure with length 0)

0x0013: **Tone generator (Valid with Controller/PLCI/NCCI)**
Parameter does not apply (coded as structure with length 0)

0x0014: **Tone generator with volume setting (Valid with Controller/NCCI)**
Parameter does not apply (coded as structure with length 0)

0x0015: **Tone generator with volume setting (Valid with Controller)**

| Data | struct | Data from D-Channel |

0x0016: **Tone generator with volume setting (Valid with Controller)**
Parameter does not apply (coded as structure with length 0)

0x0017: **Read hardware status (Valid with Controller)**
Parameter does not apply (coded as structure with length 0)

0x0018: **Enable/disable state information (Valid with Controller)**

Data	struct	State information	
		dword	Layer 1 state (0: inactive, 1: alarm, 2: active)
		dword	Layer 1 slip count
		dword	Number of layer 2 instances
		Struct	BChannel Information: This array consists of one byte for each B channel. Each byte is set to one (1) when the corresponding B channel is currently in use and to zero (0) otherwise

0x0019: **Enable/disable reconfig notification**
Parameter does not apply (coded as structure with length 0)

This parameter appears in:

MANUFACTURER_IND

Manufacturer Response Parameter (struct)

The purpose of the parameter *Manufacturer Response Parameter* is to offer additional information concerning the message MANUFACTURER_RESP.

This parameter is coded depending on the *Request Selector* as a structure with the following elements:

Request selector:

0x0011: **D-Channel Access (Valid with Controller/PLCI)**
Parameter does not apply (coded as structure with length 0)

0x0012: **Audio Control (Valid with Controller/PLCI)**
Parameter does not apply (coded as structure with length 0)

0x0013: **Tone generator (Valid with Controller/PLCI/NCCI)**
Parameter does not apply (coded as structure with length 0)

0x0014: **Tone generator with volume setting (Valid with Controller/NCCI)**
Parameter does not apply (coded as structure with length 0)

0x0015: **Layer 1 Access (Valid with Controller)**
Parameter does not apply (coded as structure with length 0)

0x0016: **Crossbar programming (Valid with Controller)**
Parameter does not apply (coded as structure with length 0)

0x0017: **Read hardware status (Valid with Controller)**
Parameter does not apply (coded as structure with length 0)

0x0018: **Enable/disable state information (Valid with Controller)**
Parameter does not apply (coded as structure with length 0)

0x0019: **Enable/disable reconfig notification**
Parameter does not apply (coded as structure with length 0)

This information element appears in:

MANUFACTURER_RESP