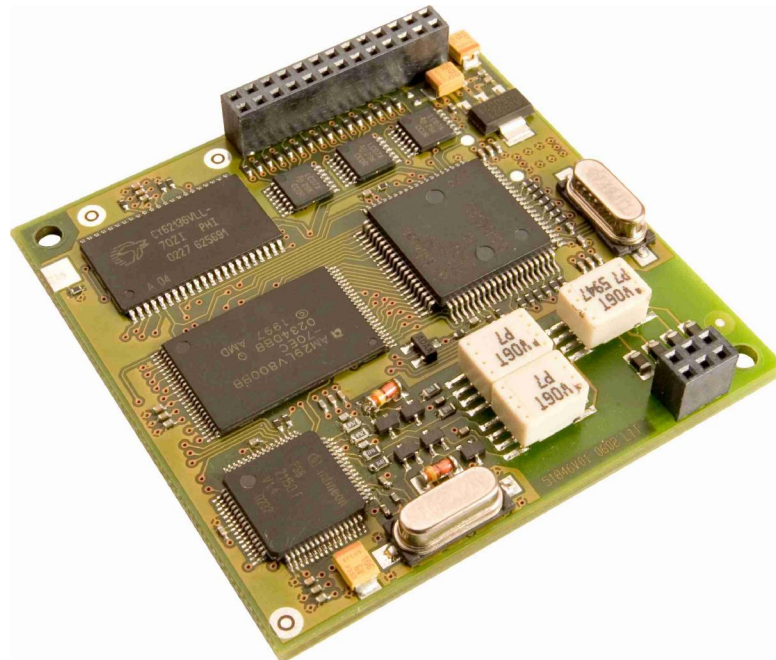


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TA+HUX

DesignGuide V1.3



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1 Objective

This DesignGuide documents how TA+HUX can be integrated into customer systems. It addresses developers of hardware and software environments for TA+HUX. For detailed information about technical data refer to the manual.

Since TA+HUX is under permanent further development, some information might alter. The following documentation is therefore meant to provide an overview. Stollmann expressly declares that this DesignGuide is no basis for a layout.

This documentation is a recommendation to the best of our knowledge. Stollmann does not assume any liability for the information in this documentation nor for any damages related to or caused by the use of this Design Guide.

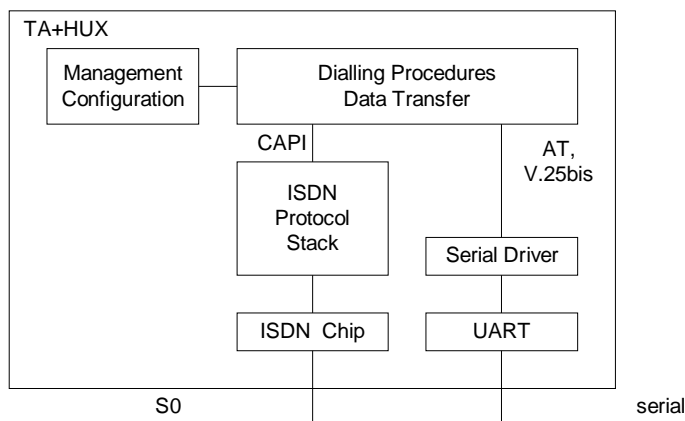
2 Product description

TA+HUX connects an asynchronous serial interface with TTL level with the ISDN BRI (S0, I.430) interface.

At the serial port it is modem compatible supporting AT-commands to control the ISDN link. Additional dialing procedures are available like Auto-connect, V.25bis and CAPI.

The ISDN BRI interface complies to the S bus I.430 specification. Several D-channel protocols like DSS1 are available.

On the B-channel a variety of protocols like HDLC, X.75, X.31 and V.110 are supported allowing the TA+HUX to be used in all typical applications using ISDN data connections.



3 Software interfaces

3.1 Dialing procedures

The following dial procedures are supported:

- AT commands
- V.25bis async
- Auto-connect (Hotline call)
- X.3 PAD
- CAPI

3.2 AT commands

Via AT-Commands you may control the ISDN connections and change the configuration of TA+HUX. ISDN specific configuration commands are supported.

3.2.1 Configuration commands

A range of parameters can be controlled by configuration commands of TA+HUX as listed below:

- Setting own msn number
- to be used B channel protocol
- characteristics of serial interface (baud rate, data flow control, etc.)
- AT/Auto-connect operation mode
- Firmware download

3.2.2 AT connection commands

Command	Function	Response
ATDxxx	Establishes a ISDN connection	Connect
ATH	Disconnects the ISDN Connection.	OK

Whenever the ISDN connection with a communication partner is established, a transparent channel for serial data is provided.

A detailed description of the AT-Commands is found in the TA+HUX manual.

3.3 Auto-connect

In case the ISDN connection should be used like a fixed line the TA+HUX auto-connect mode can be configured.

Several triggers (i.e. DTR active) may be defined which start the connection setup.

TA+HUX then behaves at the serial interface as a cable which is plugged in by establishing the ISDN connection.

Trigger	Function	Parameter
DTR active	ISDN Connect	ISDN number
Power on	ISDN Connect	ISDN number
Transmit data activity	ISDN Connect	ISDN number
ISDN link request (incoming)	Accept incoming call	None

3.4 CAPI

The CAPI is a standardized application program interface (API) for ISDN interfaces. It supports establishing connections and data transfer and can be used by several application programs concurrently. This allows it to be used very flexibly for a wide range of applications. In most cases, the CAPI is used to interface internal ISDN PC boards. Stollmann has made the CAPI available for applications working with the TA+HUX using the serial interface. The CAPI can be used wherever the possibilities of AT commands are limited.

To use the CAPI, the application program must be modified to work with the CAPI. To this end, Stollmann offers a development kit with sample programs and programming aids.

3.5 ISDN interface

ISDN specification	S0 I.430
D-channel protocols	DSS1 VN 4 National Bellcore 1-2 (NI1/2) 5ESS JATE INS NET TPH 1962 X.31 D-channel

B-channel protocols	HDLC-transparent PPP sync-async BAP/BACP/ML-PPP X.75 bit-transparent X.31/X.25 V.110/ECMA 102 V.120
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3.6 Configuration/updates

The TA+HUX can be updated locally via the serial interface or via ISDN. For configuration via ISDN, a connection is established with the internal configuration module. From that point, configuration is effected as if via the local serial interface.

3.7 Firmware updates

Firmware updates can always be effected via the local serial interface. It is also possible to update the firmware via the ISDN line if the TA+HUX has extended memory (8 MB flash memory) installed.

3.8 Management

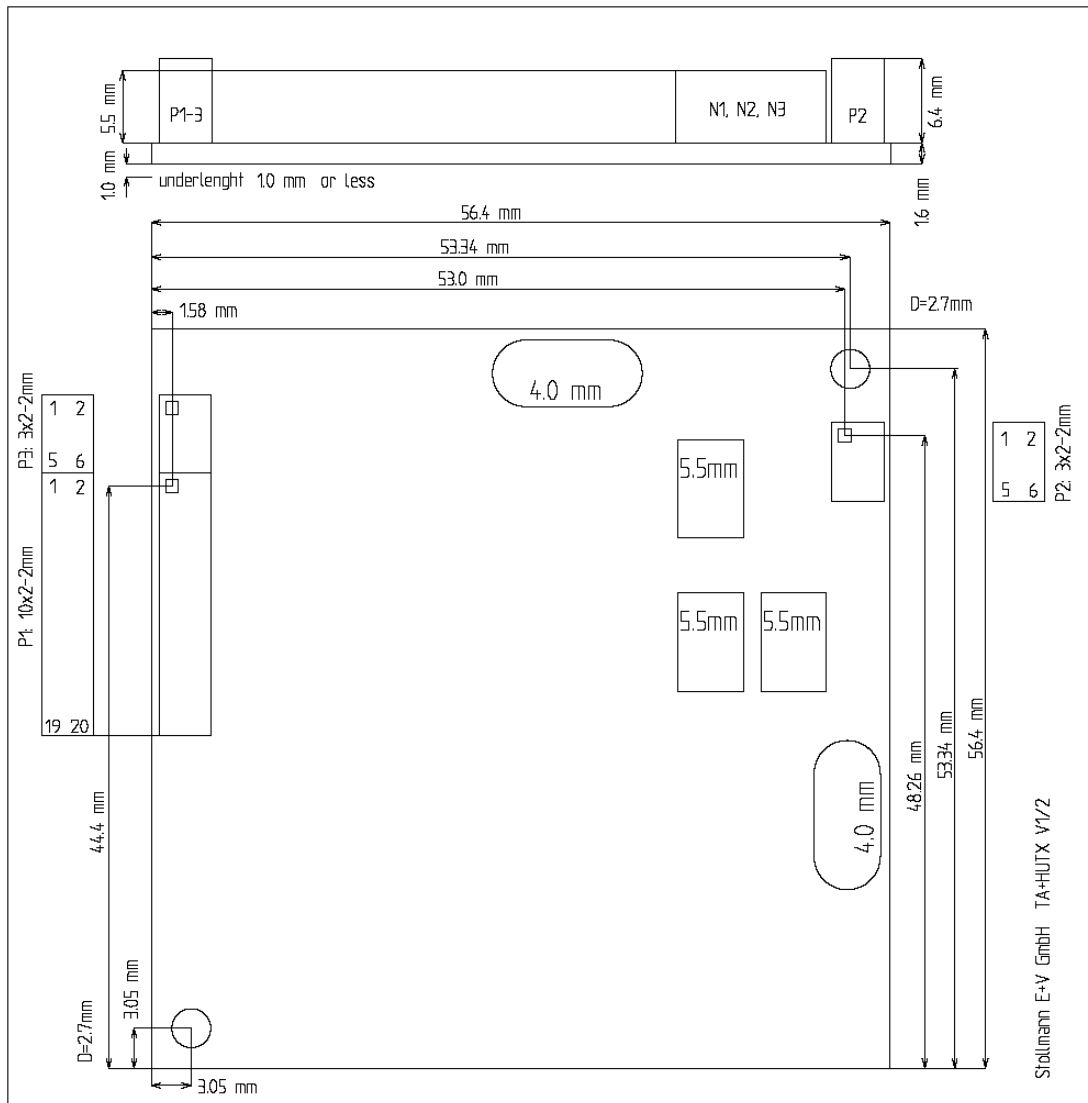
The TA+HUX features an integrated trace mode that can log internal communications at different levels. These internal logs can be read using specific commands and transmitted for subsequent analysis.

The TA+HUX has an external logging mode logging external activities in a ring buffer. These external logs can be read using specific commands.

3.9 Security

The configuration data can be accessed through the ISDN line to allow remote support and configuration. Connection and access to configuration data can be protected against unauthorized use. This can be done either by defining a password or by restricting access to a number of predefined phone numbers (white list access table).

4 Dimensions



View onto component side

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TA+HUX Dimensions	Europe	US
Width	56 mm	~2.2"
Height	10 mm	~0.4"
Length	56 mm	~2.2"
Weight	~ 12 g	~ 0.42 oz
Operating temperature	0...70 °C	32...160 °F
Humidity	90% non-condensing	90% non-condensing

5 Hardware interfaces

The TA+HUX is connected via the connectors P1 to P3. This includes:

- Power supply
- Asynchronous serial communication interface (V.24/RS-232 with TTL level)
- ISDN interface
- GPIO (2 inputs, 2 outputs)

5.1 Power Supply

The TA+HUX has a wide range input for power supply, any voltage between 3,2 V DC and 5,5 V DC is accepted.

The voltage is regulated on the TA+HUX (linear regulator). The regulator is temperature and overcurrent protected.

5.1.1 Power consumption and power down modes

To reduce power consumption of the TA+HUX, a power down mode is activated automatically by the TA+HUX.

The following values are approximate power consumption values in the different states:

Condition	Power consumption
Startup phase	40 mA
ISDN active	20 mA
Data transmission	25 mA

5.2 ISDN interface

The four lines of the ISDN interface are connected via P2. You may use the pins on P2 to connect it to the RJ45-ISDN jack on the base PCB. The signals should be routed directly to the ISDN connector on the base PCB without additional components. Below the traces between the pins of TA+HUX and the RJ45 jack on the base PCB there should be no power and ground planes. A distance of 2,5 mm should be kept to all other signals on the base PCB. A current compensated choke is integrated on the TA+HUX.

The assignment of the ISDN pins of P2 to the pins of the ISDN connector can be found in the list below.

5.3 Serial interface

TA+HUX has an asynchronous serial interface with TTL level.

- Transmission speeds 300 – 230,400 bps (asynchronous), automatic baud rate detection
- Character representation:
 - 7 bit / 8 bit
 - no, even, odd parity,
 - 1, 2 stop bit
 - Half duplex or full duplex
- Flow control hardware (RTS/CTS)

5.4 IOM Interface

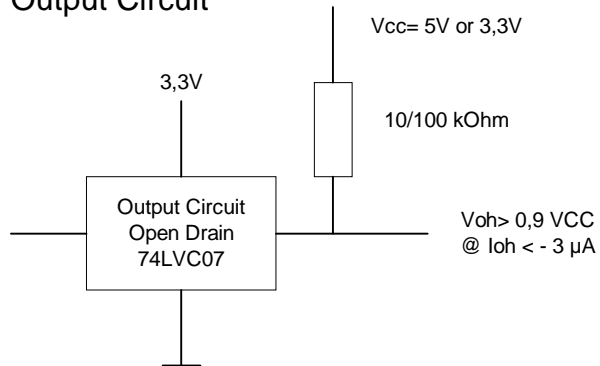
The IOM interface carries the D- and B-channel data transparently. It's typical usage is to access the B-channel for voice transmission. The IOM interface consists of 64 kbps time slots on the RX- and TX-wires, a bit clock (768 kHz), a double bit clock (1536 kHz) and a frame strobe for synchronization (8 kHz). For detailed information please refer to the IOM-s documentation of Infineon technologies.

5.5 Electrical specifications

The signal levels of the ISDN interface comply to the ISDN specification.

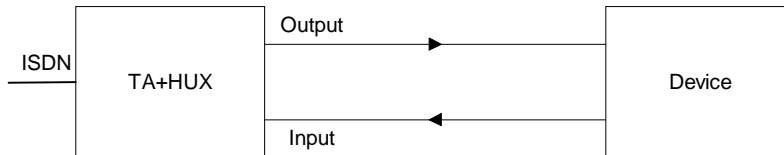
The signal levels of the serial interface and the GPIOs are dependent on the supply voltage. The inputs are in any case 5V tolerant. The outputs are supplied as open-drain over 10 kOhm (RXD, CTS) or 100 kOhm (others) by the supply voltage. Current sinks should therefore be low-active. 10mA can be driven. It is not possible to drive LEDs high active directly. Drive LEDs low active or via driver circuitry.

Output Circuit



	Vcc= 5 V	Vcc = 3,3 V
V_{IH}	2,5..5,5 V	2,5..5,5 V
V_{IL}	0..0,8 V	0..0,8 V
V_{OH}	5 V via 10 kOhm	3,3 V via 10 kOhm (RxD, CTS)
V_{OH}	5 V via 100 kOhm	3,3 V via 100 kOhm (others)
V_{OL}	0,55 V @ 10 mA	0,55 V @ 10 mA

5.5.1 Connector P1 serial DTE-Interface (TTL)



This Connector includes the serial Interface (TTL) and power supply.

Output/Input definition of table below

Pin	Signal	Direction	TA usage	External interfacing
1	GND	I	0V-Power	0V Power supply
2	VCC	I	+5V/3,3V-Power	See chapter power supply
3	GND		GND	GND
4	TXD	I	Transmit data	
5	GND		GND	GND
6	RXD	O	Receive data	
7	ID2	O	GND on TA+HUX	NC or READ
8	RTS~	I		
9	ID1	O	10k Pull up on TA+HUX	NC or READ
10	CTS~	O		
11	RESET~	I	RESET active low (see note)	NC or RESET~
12	DTR~	I		
13	L3	O	(internal 10k Pull up)	NC or status info
14	DCD~	O		
15	RI~	O		
16	DSR~	O		
17	UA	O	User Output 1	NC or status info
18	UE~	I	User Input 1	10k Pull up
19	UA2	O	User Output 2	NC or status info

20	UE2	I	User Input 2	NC, reserved
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Note: The Reset input is secured by an ESD filter and a Schmitt Trigger input.
Low pulse duration must be longer than 50 μ s to be recognized.

5.5.2 Connector P2 S0-Interface

Pin	Signal	Direction	RJ-45-Pin
1	RX-	I	5
2	TX-	O	6
3	RX+	I	4
4	TX+	O	3

5.5.3 Connector P3 IOM-Bus Interface

Pin	Signal	Direction	TA usage
1	DD	O	IOM Data downstream
2	DU	I	IOM Data upstream
3	FSC	O	IOM frame sync
4	DCL	O	IOM double bit clock
5	SDS	O	IOM B channel strobe
6	BCL	O	IOM bit clock

5.5.4 Connector type

P2	6 pol	Tyco 176264-2
P1	20 pol	Tyco 2-176264-4
P1 + P3	26 pol	tbd

6 Available models

Name	Supply	Art No.
TA+HUX	3,2 to 5,5V	51877