RTS ISDN 2002 System

Operator Manual
Software Description

TELEX.

T A B L E   O F   C O N T E N T S

1 SAFETY

The unit described is designed against the latest technical parameters and complies with all national and international safety requirements. It operates with a high level of operational safety resulting from long development experience and stringent quality control in our company.

In normal operation this equipment is safe.

There are, however, some potential sources of danger that cannot be completely eliminated.

This Operator Manual therefore contains basic safety instructions that must be observed during system configuration and operation. This Operator Manual must be read before the system is used and the current version of the document must always be kept close to the equipment.

All safety instructions have a uniform appearance. This appearance is described in detail in CHAP. 1.2 .

1.1 General Safety Requirements

In order to keep the technically unavoidable residual risk to a minimum, it is imperative to observe the following rules:

- Transport, storage and operation of the unit/system must be under the permissible conditions only.

- Installation, configuration and disassembly must be carried out only by expert personnel and with reference to the respective documentation.

- The system must be operated by expert and authorised users only.

- The system must not be operated unless it is in perfect working order.

- Any conversions or changes to the system or parts of the system (including the software) must be carried out by qualified personnel from our company or by expert personnel authorised by our company.
  All changes carried out by other persons lead to a complete exemption from liability.

- The removal or disabling of safety facilities, the clearing of faults and errors, and the maintenance of the equipment must be carried out by specially qualified personnel only.

- Non-system software is used at one´s own risk. The use/installation of non-system software can adversely affect the normal functioning of the system software.

- Only use tested and virus-free data carriers!

1.2 Appearance of the safety instructions

All safety instructions include a signal word that classifies the danger and a text block that contains descriptions of the type and cause of the danger, the consequences of ignoring the safety instruction and the measures that can be

taken to minimise the danger. In some safety instructions, a warning symbol is placed underneath the signal word (see also CHAP. 1.2.2):

Signal word	Type and cause of danger
	Possible Consequences of ignoring the safety instruction
	Measures to minimise the danger

1.2.1 Classification of safety instructions

There are five classes of safety instructions: "Danger", "Warning", "Caution", "Notice" and "Important". The classification is shown in the following table.

Result / Signal word	Death			Serious injury			Minor injury			Material damage[1]			Fault[2]		
	definite	likely	possible	definite	likely	possible	definite	likely	possible	definite	likely	possible	definite	likely	possible
DANGER[3]	▒	▒		▒	▒										
WARNiNG			■			■									
CAUTION							■	■	■	■	■				
NOTICE											■	■			
IMPORTANT													■	■	■

The signal word "Note" is also used in the Operator Manual. Text passages marked in this way do not describe a danger, but rather contain reminders, tips and general information to ensure optimum operation of the system.

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[1] Damage to product or product environment

[2] Considerable impairment to operation

[3] This danger class is not required for TITAN Micro

1.2.2 Warning symbols

The following warning symbols are used:

Symbol	Meaning
	General warning about a danger
	Warning about a dangerous electrical voltage

The safety instructions classified "Danger", "Warning" and "Caution" always include a warning symbol. "Notice" and "Important" safety instructions sometimes include a warning symbol.

2   INTRODUCTION

The RTS ISDN 2002 System incorporates two Audio codecs according to G.711 and G.722 coding algorithms for bi-directional communication. The coding delay of the 7-kHz G.722 coding algorithm is less than 10ms. The two Audio codecs included in the system can be configured as 3.1-kHz (G.711) or 7-kHz (G.722) Audio codecs. Each coded Audio signal occupies a single ISDN B channel (64-kbit/s channel). Therefore both codecs are using 2 B channels of the S_o interface. In the 7-kHz coding mode also a data signal can be transmitted. Two different types of data interfaces are available. In the G.711 Telephone mode the system detects the DTMF tones received from a standard Telephone set and converts the tones into the Telex protocol for the control of Matrix units. The system can be configured as 2 x G.711 Audio codecs with two separate Audio interfaces but one common RS485 data interface. In the 7-kHz (G.722) Audio codec mode a RS232 and a RS485 data channel are available. These data channels can be used for the interconnection of a Matrix unit to a Trunkmaster system.

3 FUNCTIONALITY

After the connection to the partner system is established audio and data transmission starts immediately. Is the 7-kHz coding standard on both systems configured both systems run in the 7-kHz mode.

For remote control of Telex Intercom equipment four operating modes are available.

Mode 1 supports a communication with a standard telephone set and transmits the received DTMF tones to the Telex Intercom equipment for remote control.

In **Mode 2** a 7-kHz connection can be established and a RS485 data channel can be used for remote control of a Matrix by key panels.

In **Mode 3** two Matrix units can be interconnected.

In **Mode 4** Matrix units are interconnected and audio signals can be routed controlled by a Trunkmaster unit. For this purpose the data interfaces of the Matrix units are connected over the RTS ISDN 2002 System to the Trunkmaster system.

4 SYSTEM DESCRIPTION

4.1 Mechanical Design

The RTS ISDN 2002 System is a 19" unit with 1 unit in high with the dimensions (W x H x D) 449 mm x 44 mm x 275 mm. RTS ISDN 2002 System can be installed as a table top unit or in 19" racks. Sufficient ventilation is ensured by ventilation holes located on the top and bottom of the housing.
Figure 1 shows the rear view of the RTS ISDN 2002 System.

Figure 1: Rear view of RTS ISDN 2002 System
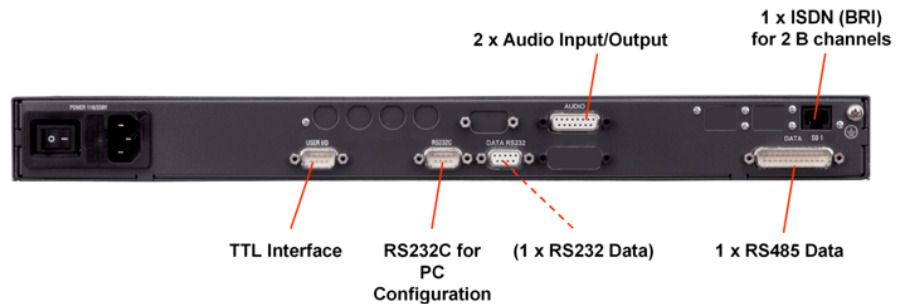
The RTS ISDN 2002 System is powered by an integrated power supply unit. with AC voltages between 90V and 253V (nominal voltage range 230-240V). The mains frequency can also vary between 50 and 60 Hz. The maximum power consumption is approx. 20 W. The equipment also has 6 LEDs on the front panel which are used for status indication of the system. The configuration of the system will be done by a PC via the control Interface (RS232) at the rear side of the unit.

4.2 Functionality

The RTS ISDN 2002 System provides 4 operating modes

4.2.1 Mode 1: Telephone to key panel

RTS ISDN 2002 System
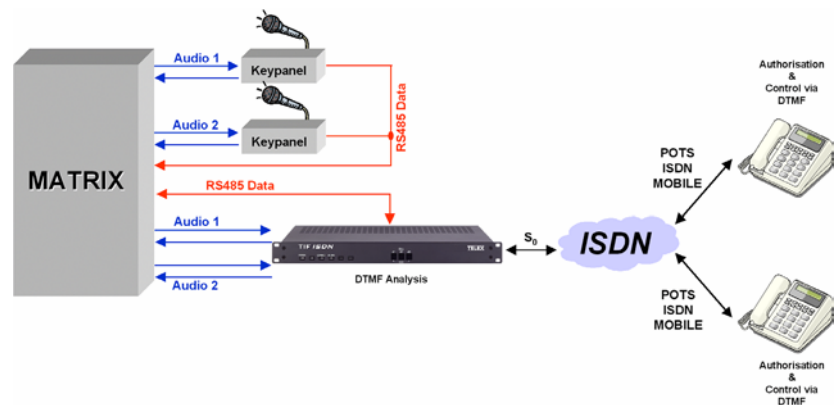
In this operating mode two Telephone sets can dial a RTS ISDN 2002 system. Via the DTMF tones of the telephones the key panels can remotely be controlled. The system converts the received DTMF tones into the Telex protocol.

4.2.2 Mode 2: Key panel to Matrix
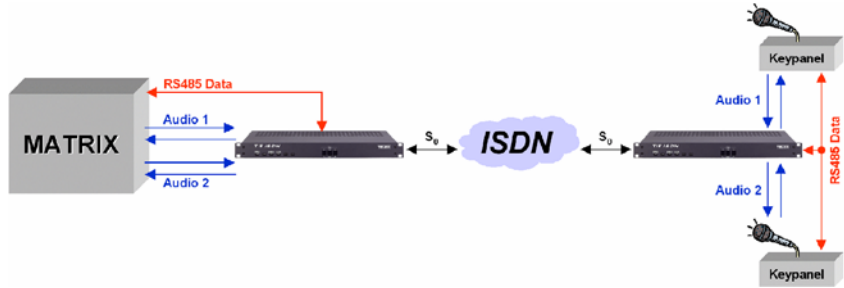
At both sides RTS ISDN 2002 products are installed. The RS485 commands are transmitted between Matrix and remote key panels by the RTS ISDN 2002 system. The Audio transmission quality is 7-kHz

4.2.3 Mode 3: Matrix to Matrix
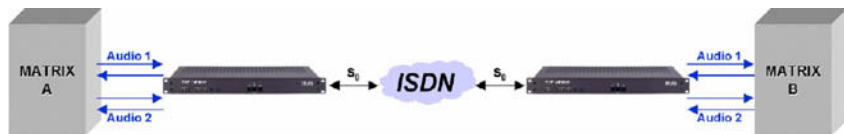
Matrix units are interconnected by 7-kHz transmission channels. Only Audio signals are transmitted.

4.2.4 Mode 4: Matrix to Matrix with Trunkmaster
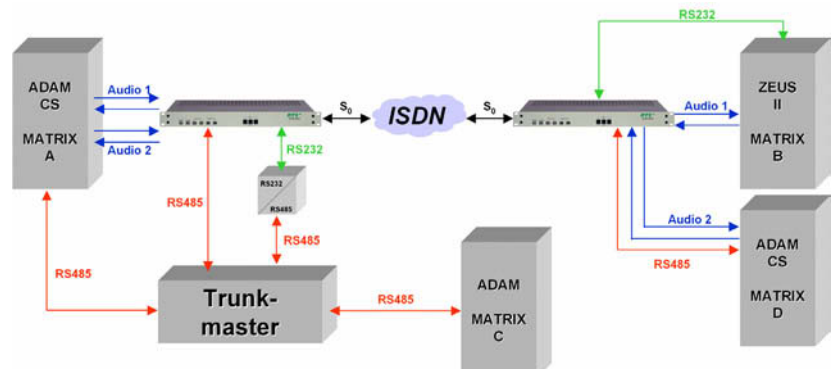
In addition to Mode 3 also one RS232 and one RS485 data channel from the remote Matrix can be transmitted to the Trunkmaster.

5 PUTTING THE SYSTEM INTO OPERATION

5.1 Mounting

With its dimensions (W x H x D) of 449 mm x 44 mm x 275 mm the RTS ISDN 2002 System can be operated as a table-top device or, be inserted into 19" racks.

The dimensions given above are valid for the table-top version with no feet. If the RTS ISDN 2002 System is to be inserted into a rack, it should be remembered that the bending radius of the cables should always be greater than the minimum allowed value.

If the RTS ISDN 2002 System is installed in a rack, it should also be ensured that sufficient ventilation is provided. It is recommended that at least 1 cm space is left next to the openings. As rule, the ambient temperature should not lie outside the range +5°C to +40°C. These limits are of particular importance if the system is inserted in a rack.

During operation, the humidity must lie between 5% and 85%.

NOTICE	Incorrect ambient temperature and humidity can lead to equipment failure
⚠	Operation of the unit outside the above limits invalidates the warranty.
	The RTS ISDN 2002 System must therefore be operated within the specified limits.

5.2 Connection to the mains voltage

The integrated power supply unit of the RTS ISDN 2002 System can be operated with a voltage (mains) between 90 V and 253 V. The mains frequency can vary between 50 Hz and 60 Hz. The power consumption is a maximum of approx. 20 W.

After putting the unit into operation, the "POWER" LED should light up. An internal reset is then triggered. This is indicated by a blinking "ALARM" LED. After approximately twenty seconds, the unit is operational and the red "Alarm" LED should stop blinking.

5.3 Signalling LEDs

There are six LEDs for signalling on the RTS ISDN 2002 System
(see Figure 2):

- Power: green
  Lights up when system is powered.

- Alarm: red
  Lights up if a fault has occurred in the unit.

- DATA CALL 1 :   green
  Is slow flashing if an outgoing call is initiated
  Is fast flashing if an incoming call is detected
  Lights up if a 7-kHz Audio connection is established for Codec 1

- DATA CALL 2 :   green
  Is slow flashing if an outgoing call is initiated
  Is fast flashing if an incoming call is detected
  Lights up if a 7-kHz Audio connection is established for Codec 2

- PHONE CALL 1 :   orange
  Is slow flashing if an outgoing call is initiated
  Is fast flashing if an incoming call is detected
  Lights up if a 3.1-kHz Audio connection is established for Codec 1

- PHONE CALL 2 :   orange
  Is slow flashing if an outgoing call is initiated
  Is fast flashing if an incoming call is detected
  Lights up if a 3.1-kHz Audio connection is established for Codec 2

Figure 2: Front view of RTS 2002 System

5.4 Configuration overview

This chapter shall give an overview of the configuration of the system. Detailed instructions are described in the following chapters.

1. Connection of Audio and data signals depending on the operation mode

2. Connection of the unit to the ISDN network

3. Loading of the Windows application software RTS ISDN 2002 (see chapter. 6.3) and configuration of the PC (see chapter 6.4.5)

4. Configuration of the Audio Codec 1

5. Configuration of the Audio Codec 2

6. Entering the ISDN numbers and dial up

7. Checking the establishing of the connection.

6 OPERATION WITH A PC

The Windows control software „RTS ISDN 2002" allows a simple configuration and control of the system.

6.1 Hardware requirements

The PC must fulfil the following minimum requirements:

- IBM PC AT, IBM PS/2 or 100% compatible

- Windows 98, 2000, XP

- approx. 1,5 MB free hard-disk memory

- a free serial interface RS-232

- *Micro*soft, IBM PS/2 or 100% software-compatible mouse

6.2 Connection of the RTS ISDN 2002 System to a PC

Connect the PC serial interface to the CONTROL (RS232C) interface on the rear panel of the RTS ISDN 2002 System. Use a RS232 cable (9-pin SUB-D DIN to 9-pin SUB-D cable).

The serial interface of RTS ISDN 2002 (RS232C) is configured in accordance with the following parameters by the factory:

- Data signal

- 19200 Baud

- 8 data bits

- no parity

The RTS ISDN 2002 System can now be controlled from the PC.

6.3 Installation of the software on the PC

For the installation [1] of the software on the PC, please place the disk in the drive of the PC. Then start the installation under Windows by selecting the **START button** and selecting the sub menu item **Command...**. Insert into the command line

a:setup

and select OK button. If your disk drive is not "a", use the corresponding designation in place of "a", Now follow the remarks of the installation program and use the recommended directory. As proposed please install a new program group „RTS ISDN 2002". In this program group you will find later the symbol for starting the program as well as a possibility for de-installation of the program.

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[1] Please make a backup copy of the original disk before installation.

After successful installation you will find now under **START → PROGRAMME**

→**RTS ISDN 2002:** Icon for starting the RTS ISDN 2002 software.

For de-installation select the icon

Uninstall

6.4 Main panel RTS ISDN 2002 Commander

After starting the software the user will get displayed the main panel. The main panel indicates the status of the
- PC connection
- ISDN connection
- Audio Codec operating modes
- Data channel interfaces
- Operating mode

In the main panel the telephone book for ISDN destination can be operated and calls can be initiated.
For the different operating modes different panels are displayed.

### 6.4.1 Operating Mode 1: Telephone to key panel

Mode 1 supports communication with standard telephone units and transmits the received DTMF tones to the Telex Intercom equipment for remote control.

6.4.1.1 Mode 1: Main panel

All necessary settings for Audio Codec 1 and Audio Codec 2 are indicated in a common panel.

- The field *PC INTERFACE* displays the selected COM port and the status the connection (**CONNECTED** or **NOT CONNECTED**).

- In the field *ISDN* the Connection State shows the status of the connection, such as **CONNECT**, **INCOMING_CALL**, **NOT_CONNECTED**

- Connected calls can be disconnected using the **Drop** button or incoming calls can be accepted selecting the **Accept** button or rejected selecting the **Reject** button.

- The selection of the *BOOK* button opens a Telephone Book stored on the PC

- In the Field *AUDIO* the coding algorithms of the Audio codecs (G.711 3.1-kHz) and the status of the AGC and Echo Canceller (**enabled** or **disabled**) are displayed

- In the field *DATA* (**Interface/Addr**.)the RS485 data interface together with its address for codec 1 and 2 are indicated

- Operating mode shows **Telephone** for Mode 1

Figure 3: Mode 1: Main panel RTS ISDN 2002 System
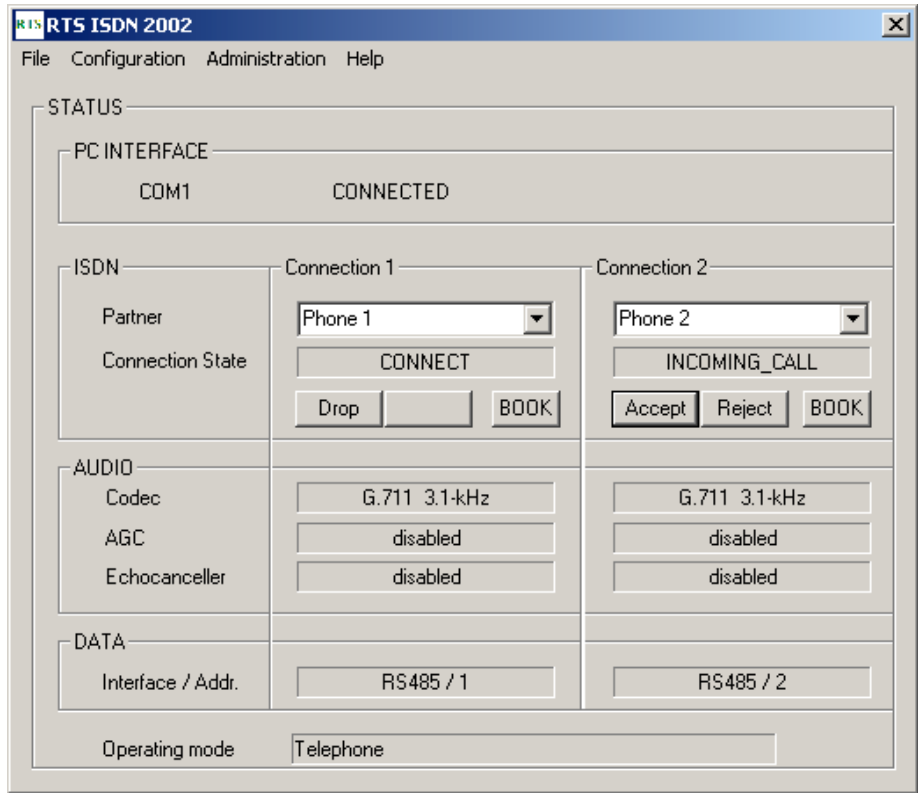
6.4.1.2 Mode 1: Configuration panel for ISDN and Data

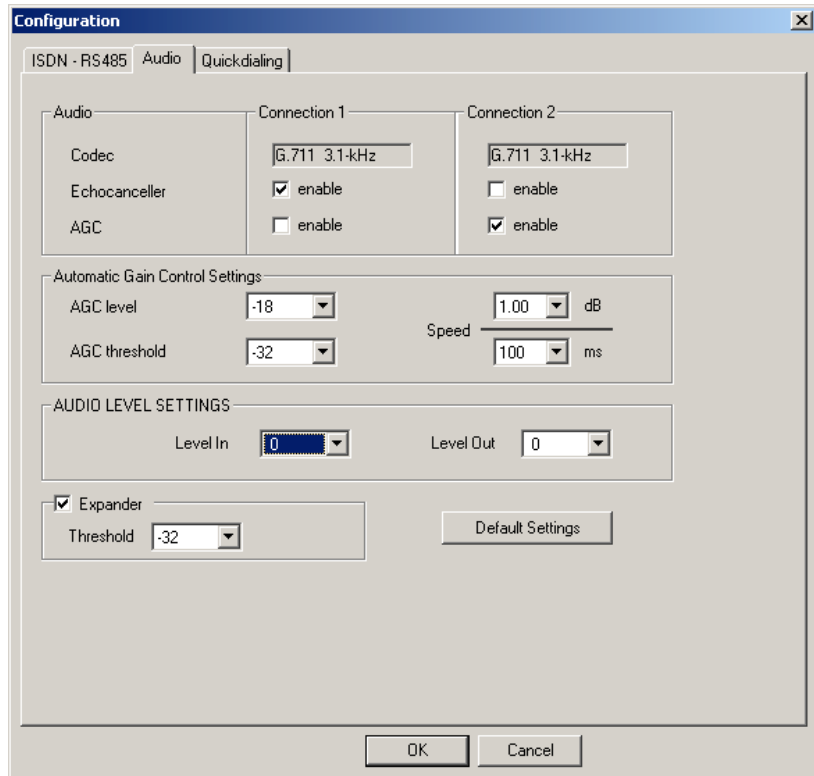**Figure 4: Mode 1: Configuration panel for ISDN and Data**

- In the **COMMON SETTINGS** Field the Operating Mode can be selected . If the **Telephone** mode is chosen the Line Mode is fixed to **ISDN dial up line**

- In the field **ISDN** the **MSN** number for each connection can be inserted also the **Auto Answer** function can be selected with a given answering time.

- In the **RS485** Field the **RS 485 address** for each Audio channel must be entered. Valid addresses are 1 ... 8.

- The Field **DATA** is not valid for operating mode 1.

6.4.1.3 Mode 1: Configuration panel for Audio

- In the **Audio** Field the coding algorithms G.711 3.1-kHz of Audio codec 1 and Audio codec 2 are displayed. For each Audio codec an Echo Canceller and an AGC can be enabled.

- In the field **Automatic Gain Control Settings** the **AGC level**, **the AGC threshold** and the **Speed** can be defined. But if possible use the **default settings.**

- In the **AUDIO LEVEL SETTINGS** Field the nominal level of the Audio interfaces can be defined.

- In the Field **Expander** the **Threshold** value can be inserted

- If not sure select **Default Settings.** In this case all levels will be set to operative values

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Figure 5: Mode 1: Configuration panel for Audio

6.4.1.4 Mode 1: Configuration panel for Quick Dialling

- In the *HOT KEY DIALLING* Field the ISDN telephone numbers for **connection 1** for codec 1 and **connection 2** for codec 2 can be entered. Connection 1 can be dialled with the left key on the front and connection 2 can be dialled with the middle key on the front.

- In the field *TTL Dialling* the ISDN telephone numbers can be adjusted to the TTL inputs for Audio codec 1 and 2

- In the *QUICK DIALLING BY KEY PANEL* Field ISDN telephone numbers can be inserted and can be adjusted to Key Panel Quick Dial Codes. With the button Refresh Phone Book all stored numbers are loaded from the RTS ISDN 2002 System

Figure 6: Mode 1: Configuration panel for Quick dialling
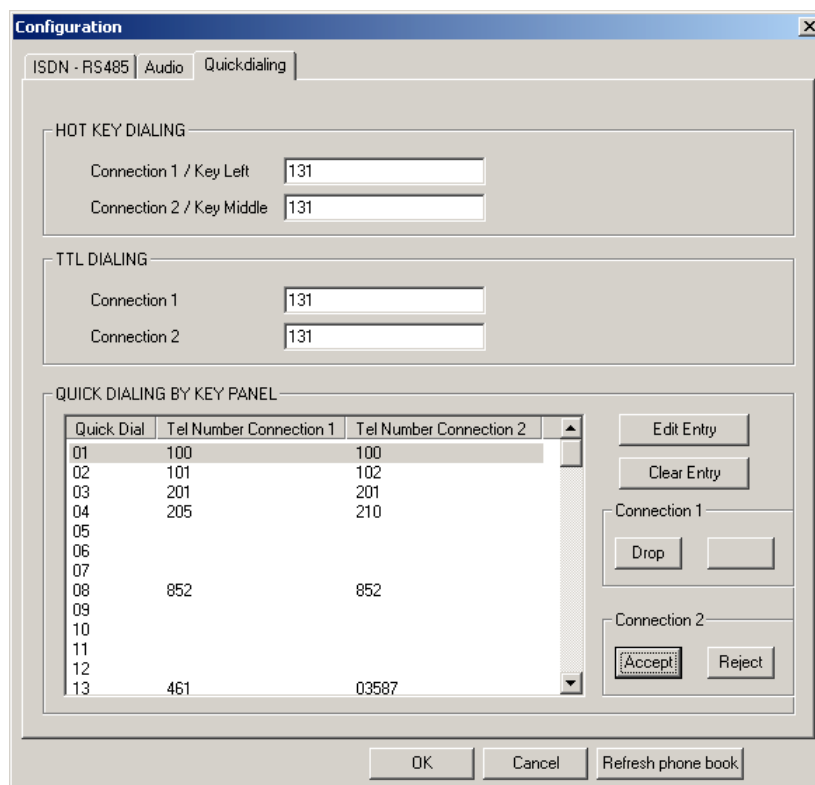
6.4.2 Operating Mode 2: Key Panel to Matrix

In **Mode 2** two 7-kHz connections can be established and a RS485 data channel can be used for remote control of a Matrix by key panels.

6.4.2.1 Mode 2: Main panel

All necessary settings for Audio Codec 1 and Audio Codec 2 are indicated in a common panel.

- The field *PC INTERFACE* displays the selected COM port and the status of the connection (**CONNECTED** or **NOT CONNECTED**).

- In the field *ISDN* the Connection State shows the status of the connection, in this case the ISDN leased line mode is configured. If there is no connection **NO SIGNAL** is indicated

- The selection of the *BOOK* button opens a Telephone Book stored on the PC

- In the Field *AUDIO* the coding algorithms of the Audio codecs (G.722 7-kHz) are displayed . In this operating mode AGC and Echo Canceller are **disabled**

- In the field *DATA* (**Interface**) the same RS485 data interface is displayed for both Audio Codecs

- Operating mode shows **Remote Keypanel** for Mode 2

Figure 7: Mode 2: Main panel RTS ISDN 2002 System
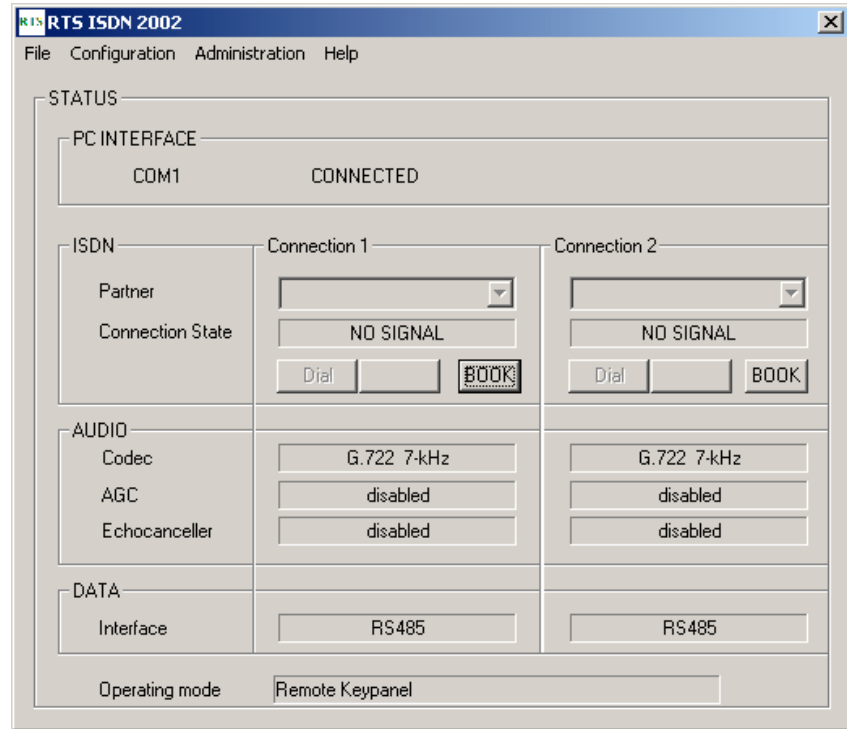
6.4.2.2 Mode 2: Configuration panel for ISDN and Data

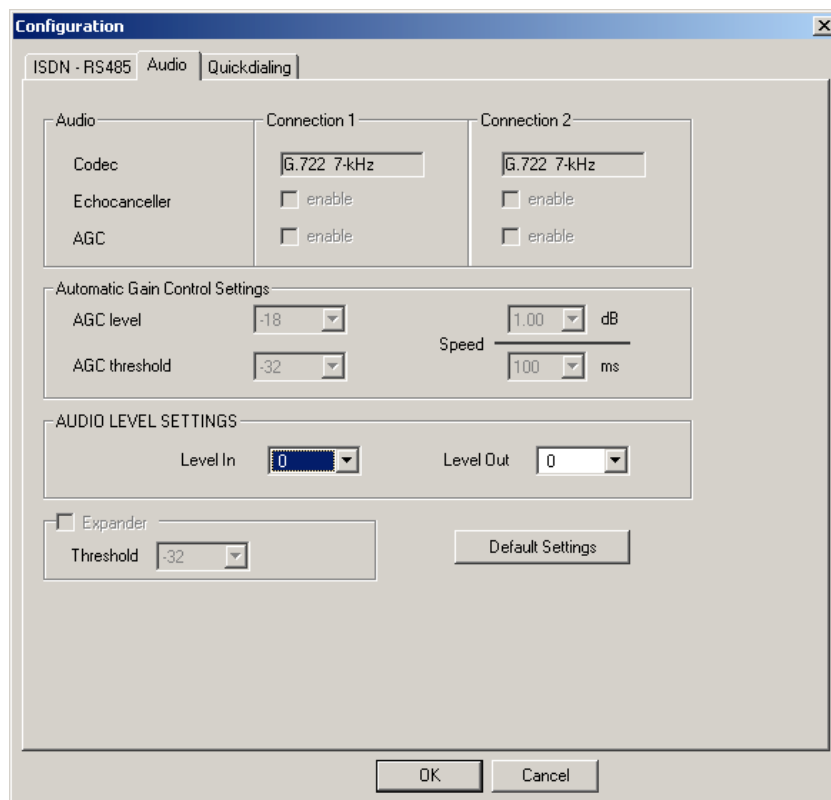**Figure 8: Mode 2: Configuration panel for ISDN and Data**

- In the *COMMON SETTINGS* Field the Operating Mode such **as Remote Keypanel** and the Line Mode such as **ISDN dial up line** or **ISDN leased line** for connection 1, connection 2 and connection 1 + 2 can be selected

- In the field *ISDN* the **MSN** number for each connection can be inserted also the **Auto Answer** function can be selected with a given answering time.

- In the *RS485* Field the **RS 485 address** for each Audio channel is not valid in this operating mode.

- The Field *DATA* is not valid for operating mode 2.

6.4.2.3 Mode 2: Configuration panel for Audio

- In the *Audio* Field the coding algorithms G.722 7-kHz of Audio codec 1 and Audio codec 2 are displayed. In this Mode Echo Canceller and AGC can not be enabled.

- In the field *Automatic Gain Control Settings* also the **AGC level**, **the AGC threshold** and the **Speed** can not be defined.

- In the *AUDIO LEVEL SETTINGS* Field the nominal levels of the audio interfaces can be defined

- In the Field *Expander* the **Threshold** value can not be inserted

- If not sure select **Default Settings.** In this case all levels will be set to operative values

Figure 9: Mode 2: Configuration panel for Audio

6.4.2.4 Mode 2: Configuration panel for Quick Dialling

- In the *HOT KEY DIALLING* Field the ISDN telephone numbers for **connection 1** for codec 1 and **connection 2** for codec 2 can be entered. Connection 1 can be dialled with the left key on the front and connection 2 can be dialled with the middle key on the front.

- In the field *TTL Dialling* the ISDN telephone numbers can be adjusted to the TTL inputs for Audio Codec 1 and 2

- In the *QUICK DIALLING BY KEY PANEL* Field ISDN telephone numbers can be inserted and can be adjusted to key Panel Quick Dial Codes and with the button Refresh the Phone Book can be loaded from the unit. This function is only available in Mode 1, but can be prepared also in the other operating modes.

Figure 10: Mode 2: Configuration panel for Quick dialling
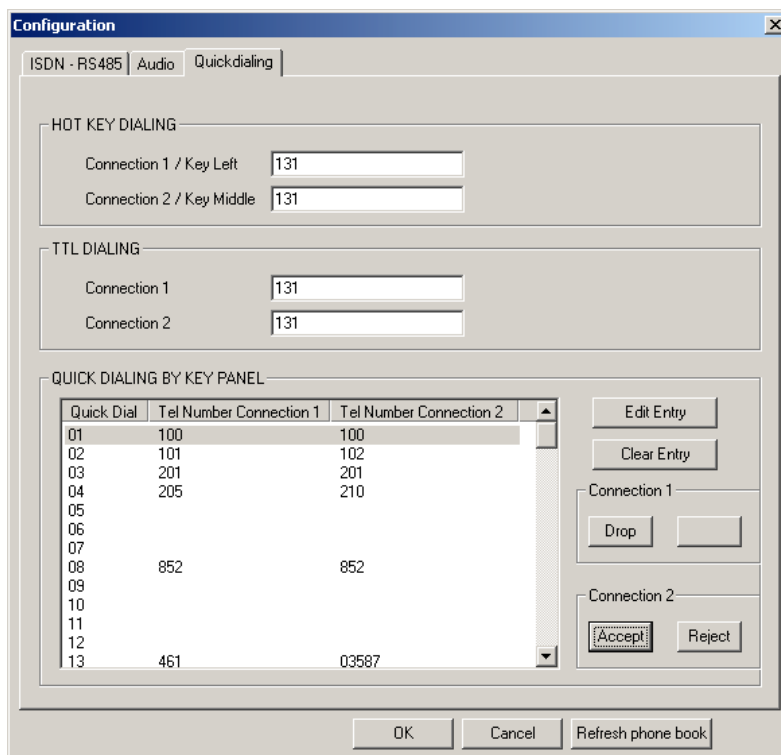
6.4.3 Operating Mode 3: Matrix to Matrix

In **Mode 3** two Matrix units can be interconnected.

6.4.3.1 Mode 3: Main panel

All necessary settings for Audio Codec 1 and Audio Codec 2 are indicated in a common panel.

- The field *PC INTERFACE* displays the selected COM port and the status of the connection (**CONNECTED** or **NOT CONNECTED**).

- In the field *ISDN* the Connection State shows the status of the connection, in this case the ISDN leased line mode is configured. If there is no connection **NO SIGNAL** is indicated

- The selection of the *BOOK* button opens a Telephone Book stored on the PC

- In the Field *AUDIO* the coding algorithms of the Audio codecs (G.722 7-kHz) are displayed. In this operating mode AGC and Echo Canceller are **disabled**

- Operating mode shows **Remote Keypanel** for Mode 3

Figure 11: Mode 3: Main panel RTS ISDN 2002 System
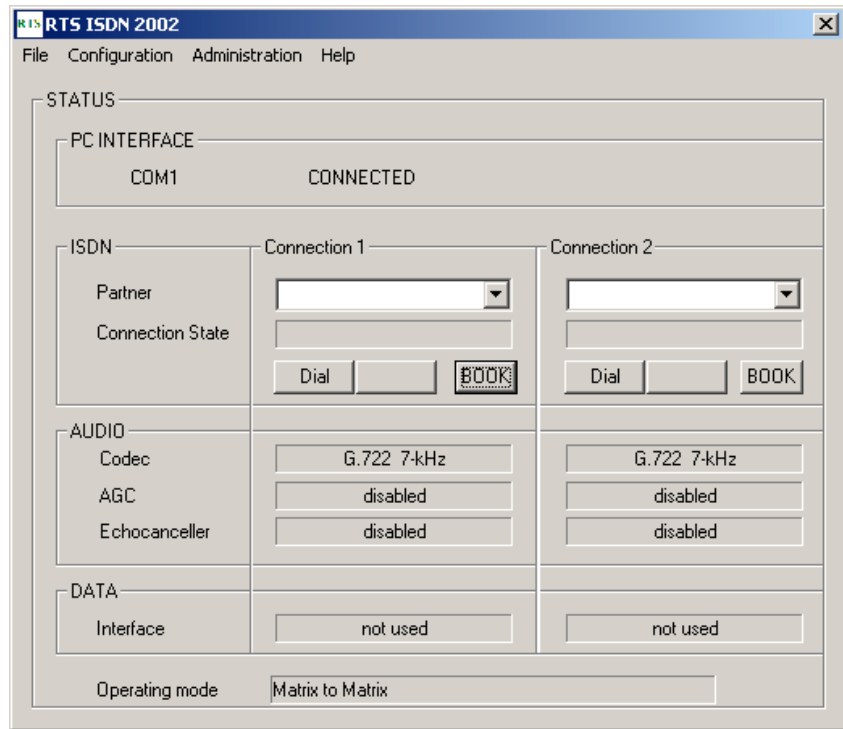
6.4.3.2 Mode 3: Configuration panel for ISDN and Data

Figure 12: Mode 3: Configuration panel for ISDN and Data

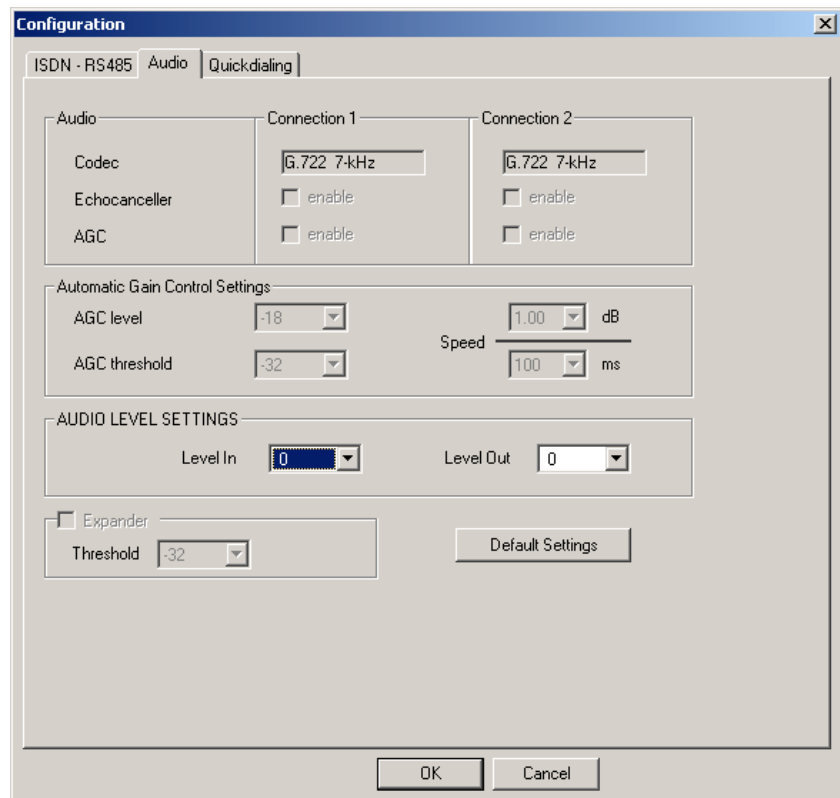- In the *COMMON SETTINGS* Field the Operating Mode such **as Matrix to Matrix** and the Line Mode such as **ISDN dial up line** or **ISDN leased line** can be selected

- In the field *ISDN* the **MSN** number for each connection can be inserted also the **Auto Answer** function can be selected with a given answering time.

- In the *RS485* Field the **RS 485 address** for each Audio channel is not valid in this operating mode.

- The Field *DATA* is not valid for operating mode 3.

6.4.3.3 Mode 3: Configuration panel for Audio

- In the *Audio* Field the coding algorithms G.722 7-kHz of Audio codec 1 and Audio codec 2 are displayed. In this Mode Echo Canceller and AGC can not be enabled.

- In the field *Automatic Gain Control Settings* also the **AGC level**, **the AGC threshold** and the **Speed** can not be defined.

- In the *AUDIO LEVEL SETTINGS* Field the nominal level of the audio signals can be defined

- In the Field *Expander* the **Threshold** value can not be inserted

- If not sure select **Default Settings.** In this case all levels will be set to operative values

Figure 13: Mode 3: Configuration panel for Audio

6.4.3.4 Mode 3: Configuration panel for Quick Dialling

- In the *HOT KEY DIALLING* Field the ISDN telephone numbers for **connection 1** for codec 1 and **connection 2** for codec 2 can be entered. Connection 1 can be dialled with the left key on the front and connection 2 can be dialled with the middle key on the front.

- In the field *TTL Dialling* the ISDN telephone numbers can be adjusted to the TTL inputs for Audio Codec 1 and 2

- In the *QUICK DIALLING BY KEY PANEL* Field ISDN telephone numbers can be inserted and can be adjusted to key Panel Quick Dial Codes and with the button Refresh the Phone Book can be loaded from the unit. This function is only available in Mode 1, but can be prepared also in the other operating modes.

Figure 14: Mode 3: Configuration panel for Quick dialling
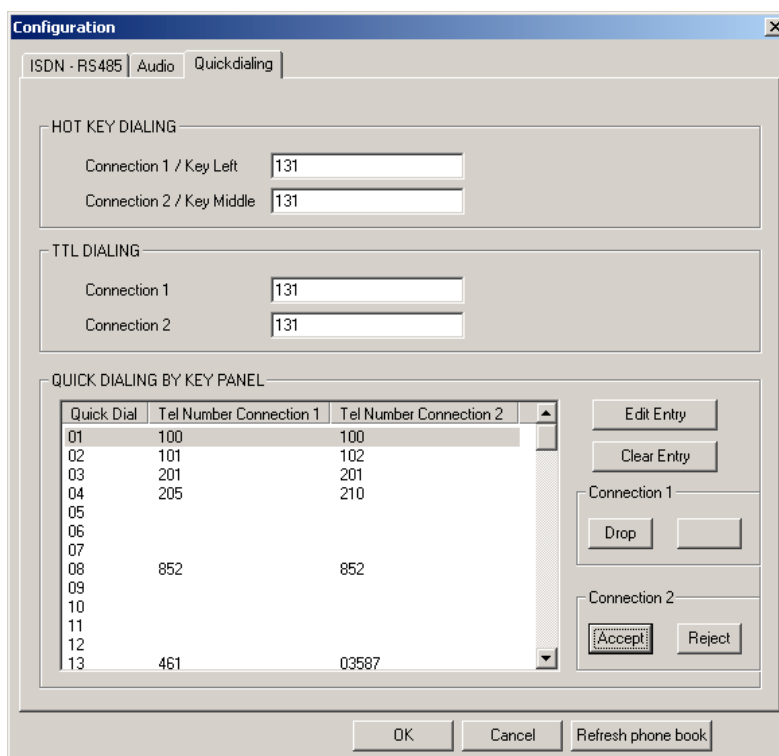
6.4.4 Operating Mode 4: Matrix to Trunkmaster

In **Mode 4** Matrix units are interconnected and audio signals can be routed controlled by a Trunkmaster unit. For this purpose the data interfaces of the Matrix units are connected over the RTS ISDN 2002 System to the Trunk-master system.

6.4.4.1 Mode 4: Main panel

All necessary settings for Audio Codec 1 and Audio Codec 2 are indicated in a common panel.

- The field *PC INTERFACE* displays the selected COM port and the status of the connection (**CONNECTED** or **NOT CONNECTED**).

- In the field *ISDN* the Connection State shows the status of the connection, in this case the ISDN leased line mode is configured. If there is no connection **NO SIGNAL** is indicated

- The selection of the *BOOK* button opens a Telephone Book stored on the PC

- In the Field *AUDIO* the coding algorithms of the Audio codecs (G.722, 7-kHz) are displayed. In this operating mode AGC and Echo Canceller are **disabled**

- Operating mode shows **Remote Keypanel** for Mode 4

Figure 15: Mode 4: Main panel RTS ISDN 2002 System
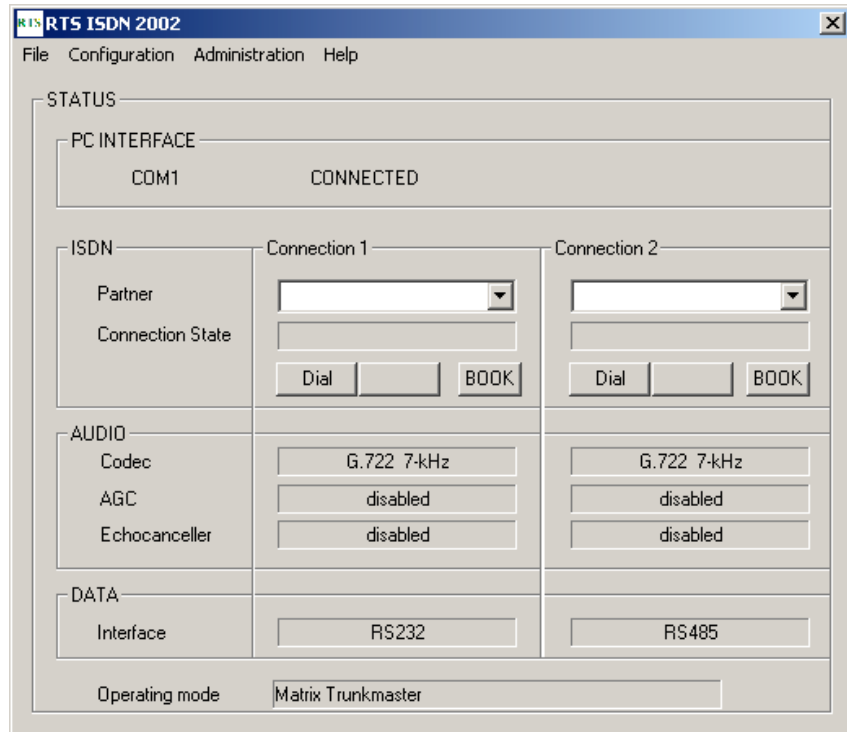
6.4.4.2 Mode 4: Configuration panel for ISDN and Data

Figure 16: Mode 4: Configuration panel for ISDN and Data

- In the *COMMON SETTINGS* Field the Operating Mode such **as Matrix Trunkmaster** and the Line Mode such as **ISDN dial up line** or **ISDN leased line** can be selected

- In the field *ISDN* the **MSN** number for each B channel can be inserted also the **Auto Answer** function can be selected with a given answering time.

- In the *RS485* Field the **RS 485 address** for each Audio channel is not valid in this operating mode.

- In the Field *DATA* the interfaces for the data channels can be selected. A RS232 and a RS485 interface are provided.

6.4.4.3 Mode 4: Configuration panel for Audio

- In the *Audio* Field the coding algorithms G.722, 7-kHz of Audio codec 1 and Audio codec 2 are displayed. In this Mode Echo Canceller and AGC can not be enabled.

- In the field *Automatic Gain Control Settings* also the **AGC level**, **the AGC threshold** and the **Speed** can not be defined.

- In the *AUDIO LEVEL SETTINGS* Field the nominal Audio levels can be defined.

- In the Field *Expander* the **Threshold** value can not be inserted

- If not sure select **Default Settings.** In this case all levels will be set to op-
  erative values

Figure 17: Mode 4: Configuration panel for Audio

6.4.4.4 Mode 4: Configuration panel for Quick Dialling

- In the *HOT KEY DIALLING* Field the ISDN telephone numbers for **con-
  nection 1** for codec 1 and **connection 2** for codec 2 can be entered.
  Connection 1 can be dialled with the left key on the front and connection 2
  can be dialled with the middle key on the front.

- In the field *TTL Dialling* the ISDN telephone numbers can be adjusted to
  the TTL inputs for Audio Codec 1 and 2

- In the *QUICK DIALLING BY KEY PANEL* Field ISDN telephone numbers
  can be inserted and can be adjusted to key Panel Quick Dial Codes and
  with the button Refresh the Phone Book can be loaded from the unit. This
  function is only available in Mode 1, but can be prepared also in the other
  operating modes.

Figure 18: Mode 4: Configuration panel for Quick dialling
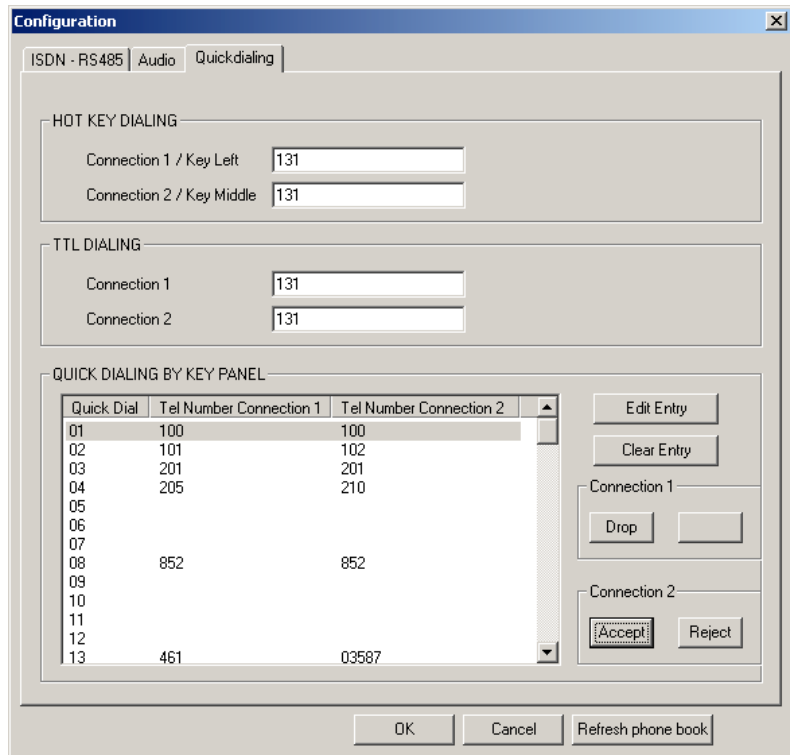
6.4.5 Sub menu COM Port

After selection of the sub menu item **COM-Port** a window for the selection and configuration of the COM interface of the PC opens. If the selected COM port is already occupied an error message will be displayed. Then select another open COM port. The Baud rate is fixed 19200 Baud.
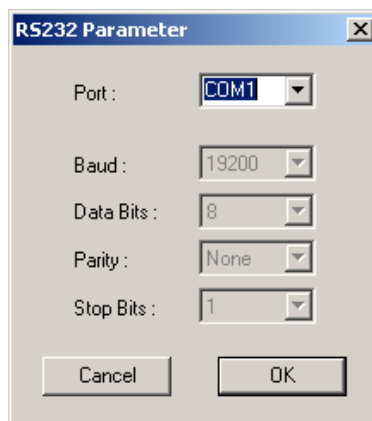
Figure 19: Sub menu COM-Port

6.4.6 Sub menu System Panel

The sub menu *System Panel* allows simple communication with RTS ISDN 2002 System. For control purpose string commands can be entered.

Figure 20: Sub menu COM-Port
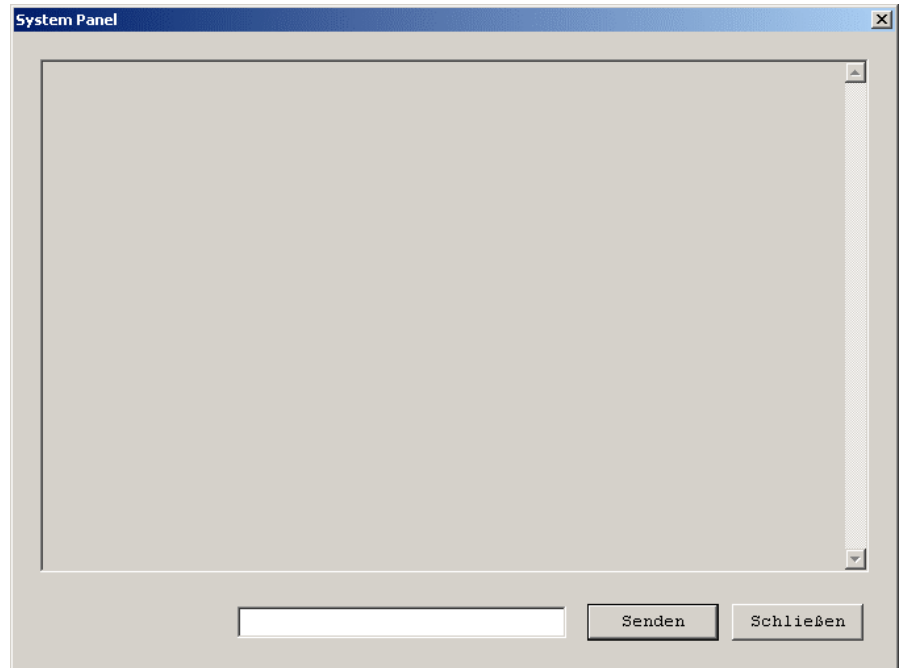
6.4.7 Sub menu Software Download

The sub menu Software Download is used to copy new software from the PC to the RTS ISDN 2002 system.
First install the new software on your PC. During the installation also the files with the new firmware are stored on your PC.
After selection of the sub menu the Software Download window opens.
One of the following software packages will be displayed in accordance to the stored software:
- IFE_RTS   Main software of the system
- So   ISDN software

The button "Browse" allows the selection of the drives of the files for the software download.
Start the transmission of the software to the RTS ISDN 2002 by selecting the button "Start Download". The button "OK" closes the window.

Figure 21: Sub menu Software Download
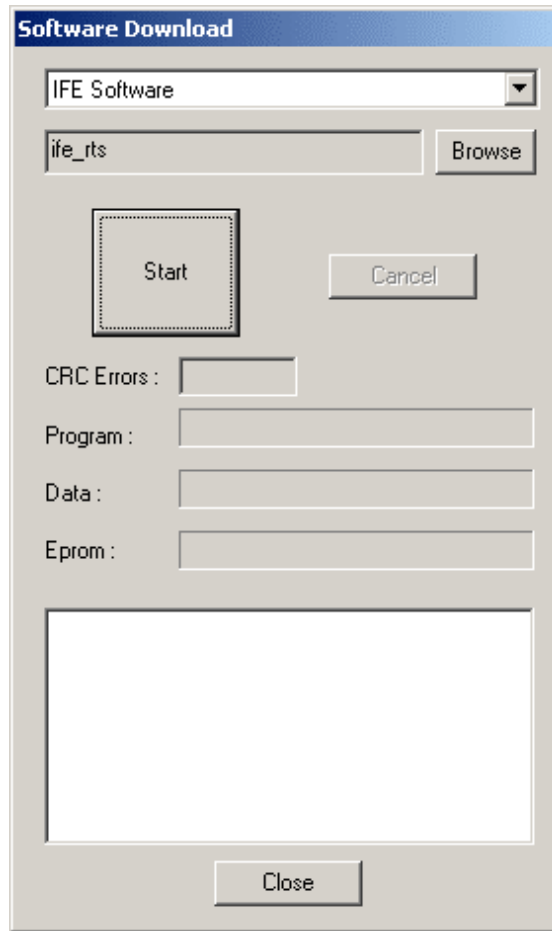
6.5 Menu Help

Company address and installed software version will be indicated in the menu help.

Figure 22: Sub menu Help

7 DIALLING

The RTS ISDN 2002 System can establish two ISDN connections over its integrated ISDN BRI (So) interface. In the following the dialling interfaces are described in detail.

7.1 Via PC Software RTS ISDN 2002 Commander

A PC can be connected to the "RS232C" control interface of the RTS ISDN 2002 unit running the RTS ISDN 2002 Commander Software. This software incorporates a telephone book where the dialling destinations can be chosen. The telephone book can be selected in the main panel of the software.

- In the field *ISDN* for each connection a button **BOOK** for the selection of the telephone book is available

Figure 23: Mode 1: Main panel RTS ISDN 2002 System
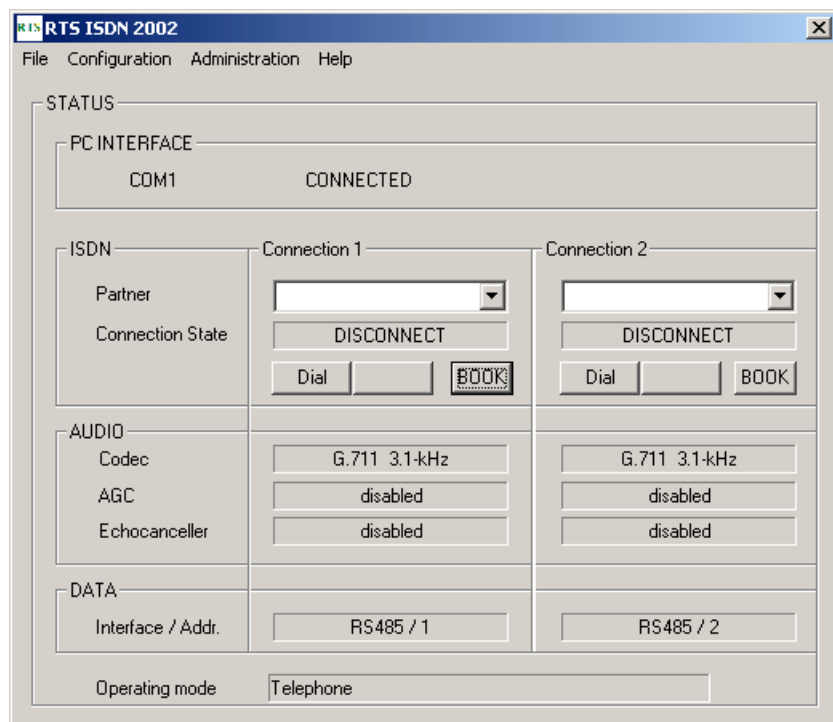
After the BOOK button is selected the telephone book is displayed.

- The telephone book incorporate the name and the associated phone number

- After selection of an entry the **OK** button can be selected. In this case the phonebook will be closed and the selected entry is displayed in the main panel.

- If the **DIAL** button will be pressed the selected destination will be dialled immediately and the phonebook will be closed.

- With the button **CANCEL** the telephone book can be closed.

- New entries can be inserted after selecting the **NEW** button

- Existing entries can be modified selecting the **EDIT** button or can be deleted selecting the **DELETE** button.

- With the **IMPORT** and **EXPORT** function telephone books can imported or the existing telephone book can be stored in a file

Figure 5: Telephone Book for Connection 1 and 2
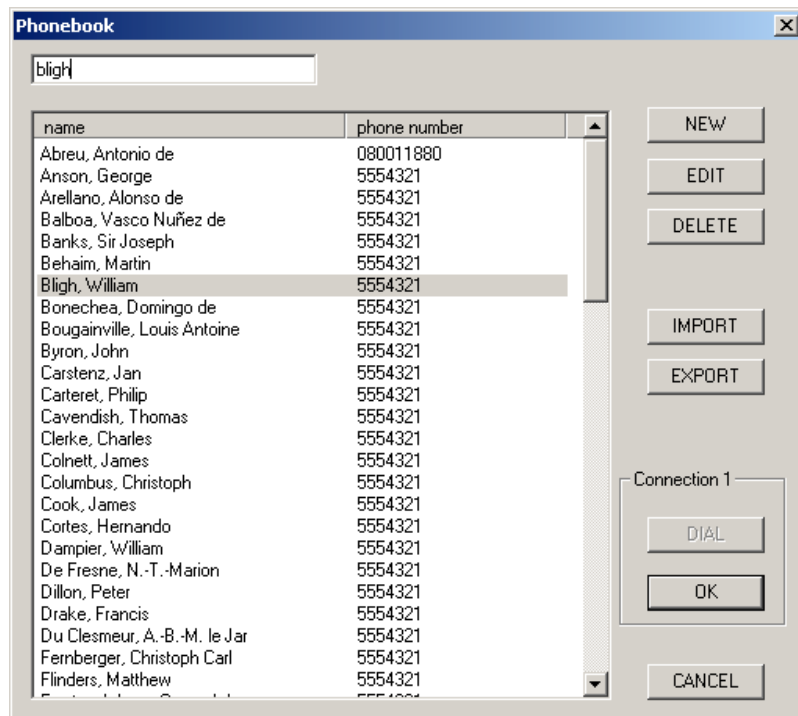
7.2 Via Front keys

The three keys on the front of the RTS ISDN 2002 system can also be used to dial the two ISDN connections for Audio Codec 1 and Audio Codec 2 and to drop one or both connections.

TABLE 7.2: Front keys		
Front key	**Function**	**Remarks**
Left	**Dialling of Connection 1**	**Left/Right:**
Middle	**Dialling of Connection 2**	**Middle/Right:**
Left/Right	**Drop of Connection 1**	**Both keys must be**
Middle/Right	**Drop of Connection 2**	**pressed together**

The telephone numbers for the left and middle key can be adjusted to the keys by the PC software.

- In the *HOT KEY DIALLING* Field the ISDN telephone numbers for **connection 1** for Audio codec 1 and **connection 2** for Audio codec 2 can be entered.

- Connection 1 can be dialled with the left key on the front

- Connection 2 can be dialled with the middle key on the front.

Figure 25: Mode 1: Configuration panel for Quick dialling

7.3 Via TTL inputs (USER I/O interface)

The USER I/O Interface provides 2 TTL inputs to dial connection 1 and connection 2. The same TTL inputs are used to drop the connections and two further TTL outputs are providing the status signal of the connection.

Pin	Function	Remarks
TABLE 7.3: TTL Interface (USER I/O)		
Pin	**Function**	**Remarks**
3	**Connection 1** **- call 1 initiation** **- disconnect call 1**	**Pin 3, 6: falling edge** **- call initiation** **Pin 3, 6: rising edge**
6	**Connection 2** **- call 2 initiation** **- disconnect call 2**	**- disconnect** **Pin 7, 8: high active**
7	**status call 1**	
8	**status call 2**	

The telephone numbers for connection 1 and connection 2 can be adjusted to the TTL Pins by the PC software.

- In the *TTL DIALING* Field the ISDN telephone numbers for **connection 1** for Audio codec 1 and **connection 2** for Audio codec 2 can be entered.

Figure 26: Mode 1: Configuration panel for Quick dialling
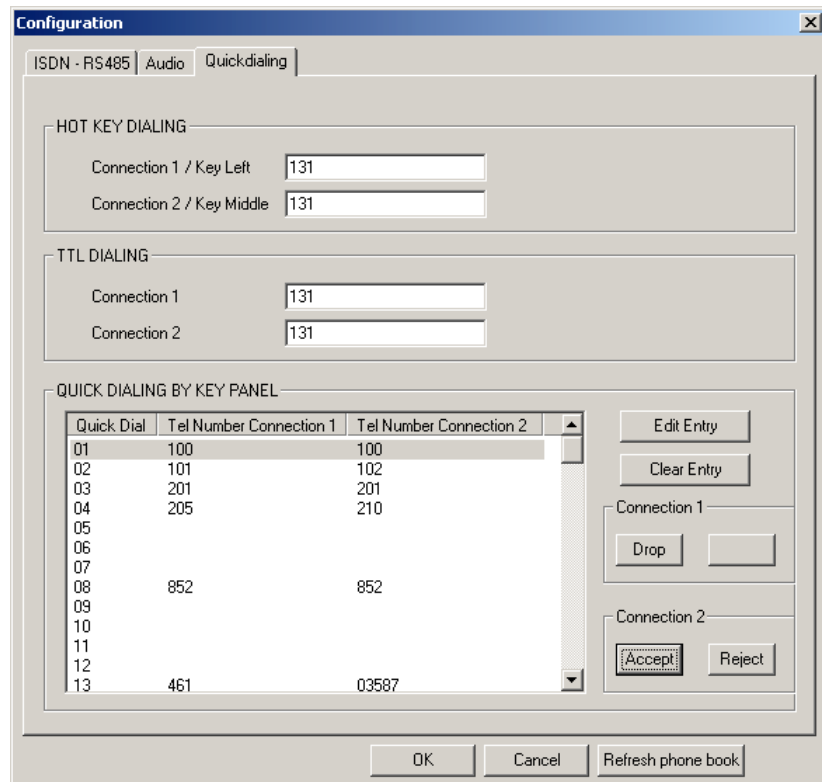
7.4 Via Telex Key panel (only Mode 1)

In operating mode 1 of the RTS ISDN 2002 System the connections of Audio codec 1 and Audio codec 2 can be initiated by key panels which are connected to the same Matrix. With the PC RTS ISDN 2002 Commander software Telephone numbers can be adjusted to quick dial numbers of the key panels. Up to 98 entries can be stored.

In the configuration menu of the software the quick dial numbers can be adjusted to the ISDN telephone numbers.

- In the *QUICK DIALING BY KEY PANEL* Field the ISDN telephone numbers for **connection 1** for Audio codec 1 and **connection 2** for Audio codec 2 can be entered and adjusted to quick dial numbers of the key panel

- 98 quick dial positions are displayed

- Empty positions can be filled pressing the **Edit Entry** button

- Existing entries can be modified selecting the **Edit Entry** button or can be deleted selecting the **Clear Entry** button

- For both connections are two buttons available. The buttons can indicate **Dial, Drop** for outgoing calls and **Reject, Accept** for incoming calls.

Figure 27: Mode 1: Configuration panel for Quick dialling

8 CALL ACCEPTANCE

Incoming calls can be accepted automatically or manually. The following procedures can be used.

8.1 Automatic call acceptance (Auto answer on)

If the auto answer function is selected, incoming calls are automatically accepted.

In the configuration menu of the software the auto answer function can be activated.

- In the *ISDN* Field the auto answer function can be selected. Also the ringing time can be defined before the auto answer function shall work.

Figure 28: Mode 1: Configuration panel for ISDN – RS485

8.2 Via Front Keys

An incoming call is indicated by flashing of one of the LEDs DATA CALL 1 or 2 or PHONE CALL 1 or 2 on the front panel.
- If LED DATA CALL 1 or LED PHONE CALL 1 is flashing the call can be accepted pressing the left key.
- In the case that LED DATA CALL 2 or PHONE CALL 2 is flashing the call can be accepted with the middle key.

8.3 Via PC Software (Connect button)

Incoming calls are indicated in the main panel of the PC software.

- In the field *ISDN* Connection State an incoming call is indicated by **IN-COMING_CALL.**

- Incoming calls can be accepted selecting the **Accept** button or rejected selecting the **Reject** button.

Figure 29: Mode 1: Main Panel
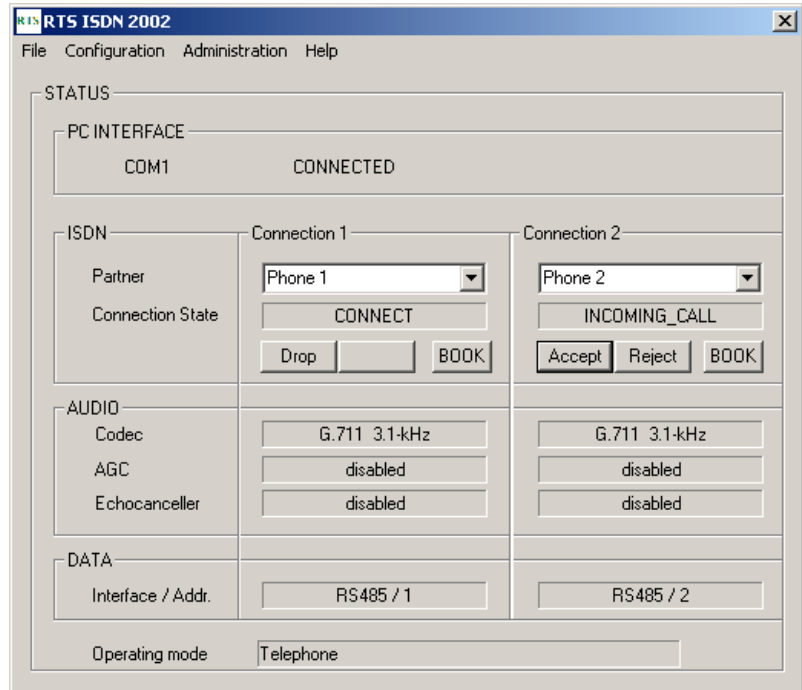
8.4 Via TTL Interface (USER I/O)

Via 2 pins of the User I/O interface the incoming calls can be accepted

TABLE 8.4: TTL Interface (USER I/O)		
Pin	Function	Remarks
3	Connection 1 - call 1 acceptance Connection 2	Pin 3, 6: falling edge - call acceptance
6	- call 2 acceptance	

8.5 Via Telex Key panel (only mode 1)

In operating mode 1 of the RTS ISDN 2002 system incoming calls are also inserted in the Telex protocol and transmitted to the Telex key panels which are connected to the same matrix. According to the Telex key panel operation calls can be accepted with the key panels.

9 INTERFACES

The connectors of the interfaces are at the rear side of the unit.

Figure 30: Rear view of RTS ISDN 2002 System
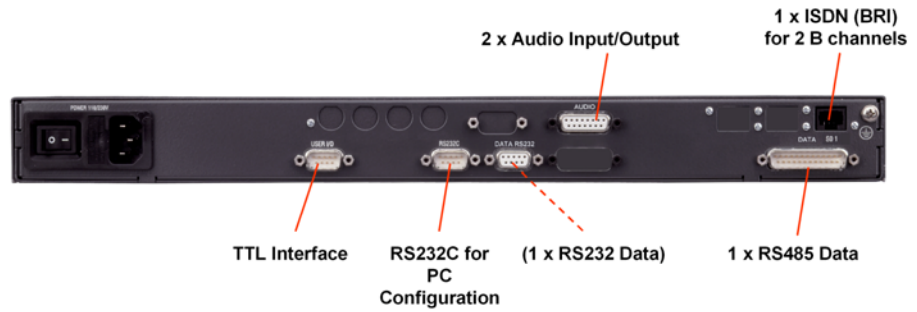
9.1 Audio interfaces (AUDIO)

RTS ISDN 2002 System incorporate one connector for its Audio interfaces. It is signed with "AUDIO". The socket assignment is shown in TABLE 9.1.

TABLE 9.1: AUDIO INPUTS/OUTPUT (AUDIO)		
Pin	Function	Remarks
1	Codec 2 in a	Audio level can be set via PC
2	Codec 2 in b	Software
3	Codec 1 in a	
4	Codec 1 in b	
5	Codec 2 out a	
6	Codec 2 out b	
7	Codec 1 out a	
8	Codec 1 out b	
9	Ground	
10	Ground	
11	Ground	
12	Ground	
13	Ground	
14	Ground	
15	Ground	

9.2 Control interface (RS232C)

Via the Control interface the whole system can be configured by a PC running the RTS ISDN 2002 Commander software. The socket assignment of the 9 pin SUB-D connector is shown in TABLE 9.2.

TABLE 9.2: RS 232 Control Interface			
Pin	Signal	Description	Characteristic
1		Not used	Type: DTE
2	RXD	Receive Data	Level: V.24
3	TXD	Transmit Data	Data rate: 19200 Baud
4		Not used	Range: max. 15 m
5	GND	Ground	Protocol: 1 start bit
6		Not used	8 data bits
7		Not used	1 stop bit
8		Not used	
9		Not used	

9.3 RS232 Data Interface (DATA RS232)

In **Mode 4** Matrix units are interconnected and audio signals can be routed controlled by a Trunkmaster unit. For this purpose a RS232 and RS485 data interfaces are available. The signals of the RS232 interface are described in TABLE 9.3 .

TABLE 9.3: RS 232 Data Interface			
Pin	Signal	Description	Characteristic
1		Not used	Type: DEE
2	RXD	Receive Data	Level: V.24
3	TXD	Transmit Data	Data rate: 9600 Baud
4		Not used	Range: max. 15 m
5	GND	Ground	Protocol: Transparent
6		Not used	1 start bit
7		Not used	8 data bits
8		Not used	1 stop bit
9		Not used	

9.4 RS 485 Data Interface (DATA)

The RS485 Data interface can be configured for Mode 1, Mode 2 and Mode 4. The pin assignment of the connector is shown in TABLE 9.4.

TABLE 9.4: RS485data Interface (SUB-D, 25-pin)			
Connect.	Signal	Description	Characteristic
1		Not used	Data Rate: 9600 Baud
2		Not used	
3		Not used	Level: V.11 symmetrical
4		Not used	
5		Not used	Protocol:
6		Not used	- RTS protocol (Mode 1)
7		Not used	- Transparent (Mode 2, 4)
8	GND	Ground	1 start bit
9		Not used	8 data bits
10		Not used	1 stop bit
11		Not used	
12		Not used	
13		Not used	
14		Not used	
15		Not used	
16	Data +	Data positive	
17	Data -	Data negative	
18		Not used	
19		Not used	
20		Not used	
21		Not used	
22		Not used	
23		Not used	
24		Not used	
25		Not used	

9.5 TTL Interface (USER I/O)

The socket TTL I/O allows the connection of TTL signals and also TTL signals can be delivered. The pin assignment of the 9 pin SUB-D connector is shown in TABLE 9.5.

TABLE 9.5: TTL Interface (USER I/O)		
Pin	Function	Remarks
1	Not used	Pin 2, 4: high active
2	Ringing call 1	Pin 3, 6: falling edge
3	- call 1 acceptance	- call acceptance
	- call 1 initiation	- call initiation
	- disconnect call 1	Pin 3, 6: rising edge
4	Ringing call 2	- disconnect
5	Ground	Pin 7, 8: high active
6	- call 2 acceptance	
	- call 2 initiation	
	- disconnect call 2	
7	status call 1	
8	status call 2	
9	not used	

9.6 ISDN (BRI) Interface (S0 1)

The signals of the ISDN BRI (S0 1) interface are described in TABLE 9.6.

Pin	Signal	Description	Characteristic
TABLE 9.6: ISDN BRI Interface: Western socket RJ45 (8-pin)			
1		Not used	Rec.: I.430
2		Not used	Data rate:
3	TXD	Transmit Data	- B channels: 2 x 64-kbit/s
4	RXD	Receive Data	- D channel: 16-kbit/s
5	RXD	Receive Data	
6	TXD	Transmit Data	
7		Not used	
8		Not used	

10 TROUBLE SHOOTING

If the system indicates a fault please make the following checks to get the system running or allocate the fault .

| Fault	Possible reason
• After putting the system into operation the 6 LEDs do not light up for approximately 1 second.	⇒ Please check whether the mains voltage is missing.
• The system is in operation but Windows application software can not recognise the system.	⇒ Is a RS232 control cable used for the interconnection of PC RTS ISDN 2002 System (RS232C connector)?
	⇒ Is the right COM-Port of the PC selected (see chapter 6.4.5)?
• No incoming Audio signal at Audio interface 1	⇒ Is LED "DATA CALL 1" or LED "PHONE CALL 1" lighting?
• No incoming Audio signal at Audio interface 2	⇒ Is LED "DATA CALL 2" or LED "PHONE CALL 2" lighting?

11 CABLING

In this paragraph the cables for the interconnection of the RTS ISDN 2002 System to Matrix unit and Key Panel are described.

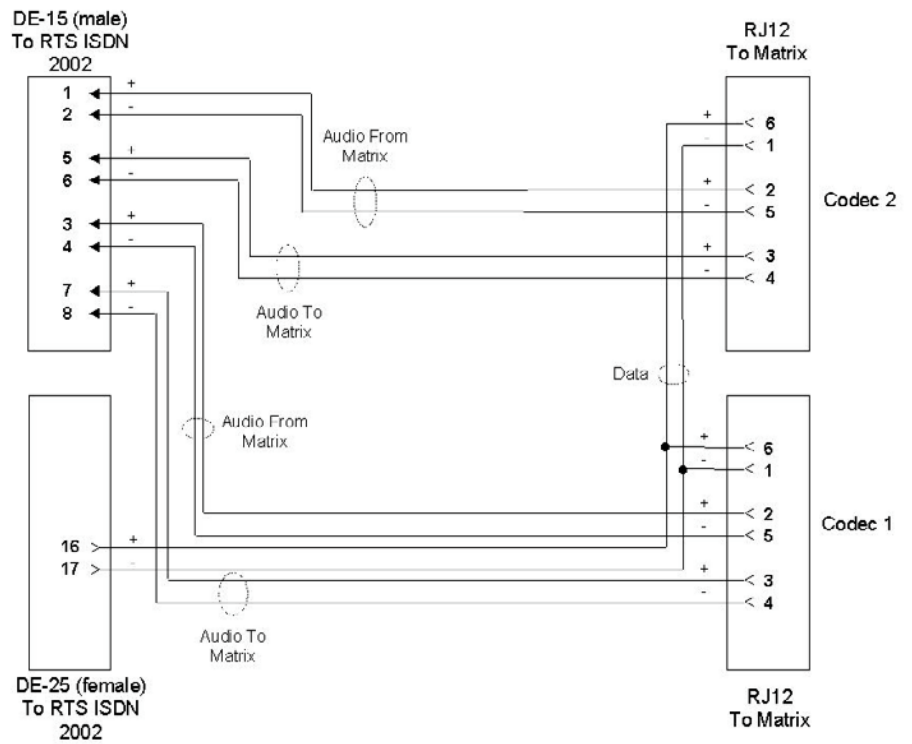## 11.1 Matrix Connection Cable

The Adam and Zeus matrix units can be delivered with DE-9 or RJ12 connectors.
Figure 31 shows the cable wiring for the interconnection cable for DE-9 connectors on the matrix and Figure 32 the wiring for RJ12 connectors on the matrix.

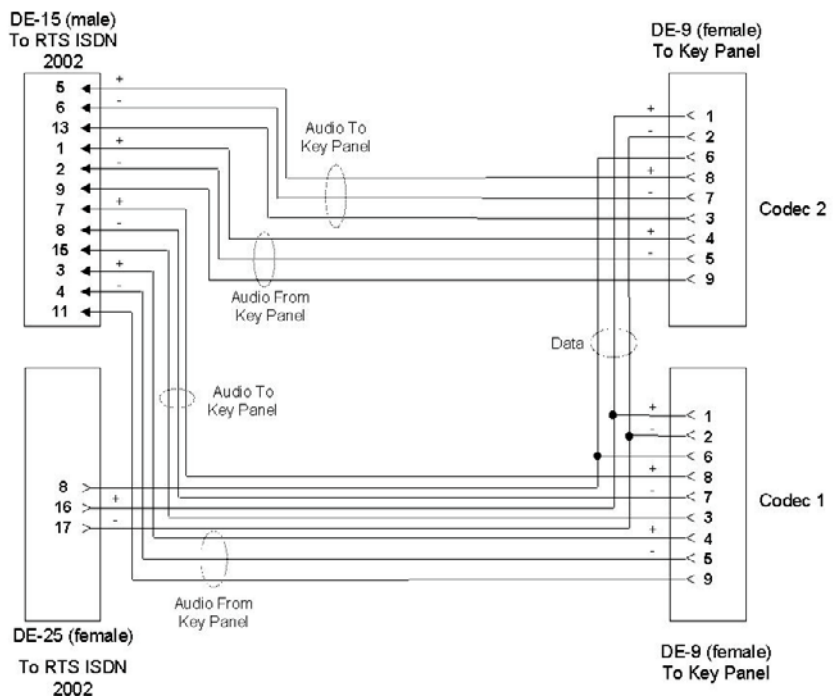**Figure 31: DE-9 intercom cable Matrix**
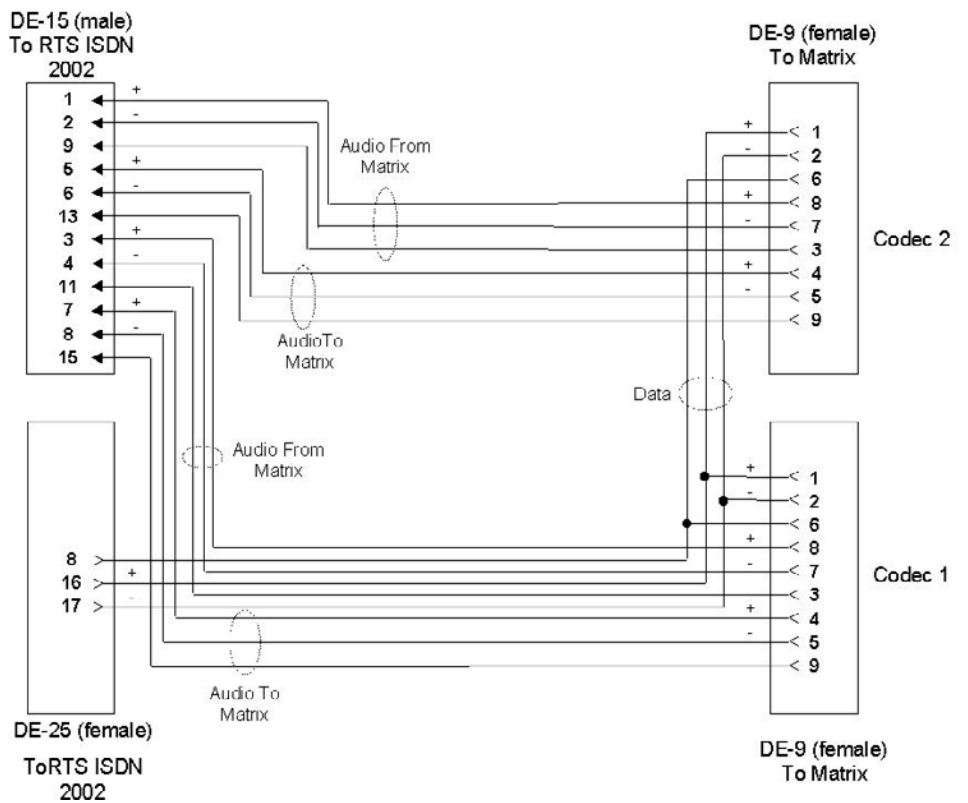
Figure 32: RJ12 intercom cable Matrix

11.2 Key Panel Connection Cable

The Key Panels incorporate DE-9 and RJ12 interfaces for the connection to RTS ISDN 2002 System. Figures 33 and 34 show the cable wiring for the interconnection cables for DE-9 and RJ12 interfaces on the Key Panel.

Figure 33: DE-9 intercom cable Key Panel

Figure 34: RJ12 intercom cable Key Panel