English

Fujitsu Software BS2000

CMX/CPP

Configuration with KOGS Macros

User Guide

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1 Configuring with KOGS macros

In order to use CCP-ISDN, you must first configure the appropriate products (including any add-on products such as CS-ROUTE, TRANSIT-SERVER, etc.). The CCP-ISDN configuration describes the characteristics of the ISDN or X25 network as well as the local subnetwork connection. It is stored in a configuration file (CF).

You configure by assigning specific values to operands. The operand values are partly dependent on the network connection and operating characteristics. Some network-specific parameters must therefore be requested before configuration, if they are not passed on to you by the network provider when you order the access.

You can create a configuration file (CF) in two ways:

– by using the menu system

– by editing a configuration file with KOGS macros

You create a standard configuration, which is adequate for most cases, with the menu-controlled configuration. If you create a CF with KOGS macros, more operands are available to you for configuration than with menu-controlled configuration.

You should only create a CF with KOGS macros if the standard configuration does not fulfill your requirements. We recommend that you first create a configuration file with the menu system and then edit this (see section “Creating a configuration file” on page 2).

You must note the following when editing a configuration file created in the menu system:

– A CF created with the menu system can only be directly edited with the menu system. If you want to use a text editor to edit a CF created with the menu system, you must first make a copy of the CF. You can then edit this copy with a text editor to conform to your wishes.

– A CF created or edited with a text editor cannot be edited later with the menu system.

1.1 Creating a configuration file

The following sections describe creating a configuration file by editing a CF with KOGS (configuration-oriented generator language). They contain all the information required for creating a configuration file with KOGS.

KOGS is a configuration-oriented generator language that can be used to formulate a KOGS source file. The subsequent compiling of the KOGS source file creates a configuration file (CF). This CF is loaded when CCP-ISDN is started up. The configuration file consists of a number of macros with system and line-specific operands.

Operands are divided into mandatory and optional operands:

– You must assign a value to mandatory operands.

– With optional operands, you can choose whether you want to assign a value. If you do not assign a value to an optional operand, CCP-ISDN uses the preset default value internally. Default values are shown underscored in the following macro descriptions.

Compiling a KOGS source file

After you have edited the KOGS source file to your requirements, close the file and exit the editor. Then compile the source file using the relevant CMXGUI or menu system function. The result of the compilation is a configuration file (CF) that is loaded when CCP-ISDN is started and sets the required CCP-ISDN configuration. Self-explanatory error messages are displayed on the screen if errors occur during compilation. If this happens, correct the KOGS source file and then recompile it.

Assigning a configuration file to a Communications Controller

You later assign the configuration to a specific CC (Communications Controller). You can also use the *exchange* command for this process.

1.1.1 KOGS source file syntax rules

The syntax rules for calling macros and operands and including comments within a KOGS source file are described in the following section.

Calling macros

Observe the following rules when calling macros within a KOGS source file:

– A macro is called by specifying its name and operands.

– Macro names are detected from the second column on. They must therefore always be preceded by at least one blank.

– No distinction is made between upper and lower case.

– The first operand in a macro must be in the same line as the macro name. The maximum line length in a KOGS source file must not exceed 71 characters.

– A macro name is terminated with a blank or end-of-line character. Any required number of comment or blank lines are allowed either before, after or between macro specifications.

– The various macros in a source file must be called in a specific order. Information on the call sequence can be found in section “KOGS macro call sequence” on page 6.

Specifying the operands

Observe the following rules when specifying an operand within the KOGS source file:

– Operands are character strings that must be specified in the form *keyword=value*, where *keyword* represents the respective operand name and *value* the assigned value.

– Any number of blanks are permitted before and after the equals sign, however, an operand must be defined within a line.

– The maximum line length in a KOGS source file must not exceed 71 characters.

– The individual operands of a macro are separated by commas. These commas must follow directly after the operand value, without intervening blanks or new lines. The last operand in a macro is not followed by a comma.

– No distinction is made between upper and lower case.

– The operands within a macro can be in any order.

– Operands within a macro must not be separated by blank or comment lines.

Comments

The following comment options are available to you:

– A comment can be initiated by an asterisk (*) or the number symbol (#) in the first column. It can extend over the complete length of the line (comment line). A comment line must not separate operands within a macro.

– A comment can be initiated by a semi-colon (;) and extend to the end of the line (line comment). Every line in a KOGS source file can contain a line comment after macro names, operands or a comment character.

– All strings that start in the first column are taken to be comments. They can be followed by a macro name, separated by at least one blank.

– The maximum line length in a KOGS source file must not exceed 71 characters.

– A blank line is also taken to be a comment. It can consist of no characters (just the end-of-line character) or blanks and the end-of-line character.

Example of a syntactically correct KOGS source file


```
* E x a m p l e – K O G S
#    2nd comment line
*        .
*        .
# (any number of comment lines)
*        .
*        .
    XSYSP
#
* The macro call must not be interrupted by
* comment lines or blank lines
#
    XLTNG LPUFADR = 1
.
.
.
    XEND             ; End of KOGS (line comment)
#
# (any number of comment and blank lines)
*        .
*        .
```

1.1.2 KOGS macro call sequence

The macros must be called in a specific order within a KOGS source file. Contraventions of this call sequence results in syntax errors during compilation of the KOGS source file. The order and call number of the separate macros are shown in table 1. The macro XRUF may be called in any order. This macro must only be placed after the XLTNG and before the XEND macros.

Call sequence:

Macro	Meaning	Max. number of calls	Mandatory macro?
XSYSP	Open KOGS	1	yes
XSNID	Define local subnetwork interface	1 - 6	yes
XFACI	Define X.25 facilities and parameters	any	no
XLTNG	Define line operands	1 - 6	yes
XZSTW	Define X.25 attributes with two-step dialing	any	no
XRUF	Define subscriber number list	0 - 2	no
XEND	End KOGS	1	yes

Table 1: Call sequence of macros in the KOGS source file

1.1.3 Overview of KOGS macros

This section contains an overview of KOGS macros, together with the operands relevant for CCP-ISDN and their permitted value ranges. The macros are listed in alphabetical order. This is followed by detailed descriptions of the individual KOGS macros and their operands.

Entries for optional operands are enclosed within square brackets [...]. The brackets must not be entered.

XEND macro:

Operands	Operand value	Meaning
Without operands	None	Syntactic end of the KOGS source file

Table 2: Operands of the XEND macro

XFACI macro:

Operands	Operand value	Meaning
[AKFACI]	REVCH FASTSEL *list*	For SVCs only. Reverse charging and Fast Select Acceptance for an incoming call
[DTEADCA]	JA (YES) TOANPI SUPLAD *list*	Specifies if the DTE address is to be entered in the call accept packet on accepting an X.25 call, or defines the DTE address format
FACIL	*name* (max. 7 characters)	Name of X.25 facilities
[NUI]	*string*	Network User Identification assigned by the network provider
[PAKLE]	16...128...2048 (power of 2)	Packet length in receive direction in bytes
[PAKLS]	16...128...2048 (power of 2)	Packet length in send direction in bytes

Table 3: Operands of the XFACI macro

Operands	Operand value	Meaning
[PAKNUM]	MOD8 MOD128	Modulo format for X.25 packet numbering
[R20]	1...10...128	Retry counter for restart request
[R22]	1...10...128	Retry counter for reset request
[R23]	1...2...128	Retry counter for clear request
[T20]	1...10...2048	Monitoring period for restart request
[T21]	1...200...2048	Monitoring period for connection request
[T22]	1...10...2048	Monitoring period for reset request
[T23]	1...10...2048	Monitoring period for clear request
[T24]	0...2048	Monitoring period for sending an RR or RNR packet
[T25]	0...180...2048	Monitoring period for outstanding acknowledgment of data packets
[WINDE]	1...2...7 (for PAKNUM=MOD8) 1...2...127 (for PAKNUM=MOD128)	Number of unacknowledged data packets that may be sent from the network
[WINDS]	1...2...7 (for PAKNUM=MOD8) 1...2...127 (for PAKNUM=MOD128)	Number of unacknowledged data packets that may be sent into the network

Table 3: Operands of the XFACI macro

XLTNG macro:

Operands	Operand value	Meaning	Comment	FV	W v
[DTEADR]	*decimal value*	Own DTE address (X.25 main subscriber number)	Only for perm. conn. with X.25	X	
[FACIL]	*name* (max. 7 characters)	Reference to the XFACI macro	Only for perm. conn. with X.25	X	
LPUFADR	00 01 02 20 21 22	Identification of a line port	Values must be assigned in ascending order	X	X
[MLNK]	1...9	Bundle number of a multilink bundle	Only for perm. conn. without X.25	X	
[PHF]	D B DB	Channel specification for transfer of X.25 data for X.25 maximum integration (X.31 case B)	Only for Euro-ISDN with X.25		X
[PKANALN]	*a-z* $0 \leq a \leq z \leq 4095$	Range of logical X.25 channels for PVCs	Only for perm. conn. with X.25	X	
[RUFNUM]	*value* or '*value*' or "*value*" (max. 17 characters)	Own ISDN subscriber number			X
[RUFPAUS]	5...<u>10</u>...40	Pause time between unsuccessful connection setup and retry	Only for switched connection		X

Table 4: Operands of the XLTNG macro

Operands	Operand value	Meaning	Comment	FV	W v
[RUFVERZ]	*name*	Name of list containing all subscriber numbers (MSNs) of the ISDN access	Only for Euro-ISDN		X
[RUFWDH]	0...8	Number of call retries if an outgoing call was unsuccessful	Only for switched connection		X
[SKANABG]	*a-z* $1 \le a \le z \le 4095$	Numbers of the logical X.25 channels for outgoing SVCs	Only for permanent connection with X.25	X	
[SKANALN]	*a-z* $1 \le a \le z \le 4095$	Numbers of the logical X.25 channels for incoming and outgoing SVCs	Only for permanent connection with X.25	X	
[SKANANK]	*a-z* $1 \le a \le z \le 4095$	Numbers of the logical X.25 channels for incoming SVCs	Only for permanent connection with X.25	X	
[SNP]	HDLC T.70 PPP IDLC X.25M	Assign subnet protocol (SNP) to a channel or ISDN connection		X	X
[SNU]	NEA TP02 IP X.29 OTHERS	Assign subnet user protocol (SNU) to a channel or ISDN connection	The value IP is only required if PPP is not used.	X	X
[UEKONF]	PZP BUS	Connection configuration (bus or point-to-point)	Only PZP allowed for perm. conn.	X	X

Table 4: Operands of the XLTNG macro

Operands	**Operand value**	**Meaning**	**Comment**	**FV**	**W v**
[UEPROZ]	HDLC/BAC HDLC/LAPB HDLC/LAPD HDLC/LAPD-TEI Q.922 HDLC/FRAMING	Transfer protocol in the ISO protected data link layer (layer 2)		X X X X	X X
UEWEG	ISDN-FV ISDN-FVX25/TYP5 ISDN-FVX25/TYP6 ISDN-FVX25/TYP8 ISDN-FVX25/TYP9 ISDN-FVX25/TYP56 ISDN-FVX25/TYP58 ISDN-S0/TYP01 ISDN-S0/TYP01A ISDN-S0/TYP03 ISDN-S2	Operating mode of ISDN access		X X X X X X	X X X X
[VUEZEIT]	0...<u>24</u>...127	Connection monitoring			X
[X25TEI]	*name*	Terminal endpoint identifier for the X.25 data transfer channel in the signaling channel (D-channel)	only for Euro-ISDN	X	X

Table 4: Operands of the XLTNG macro

XRUF macro (only for Euro-ISDN):

Operands	Operand Value	Meaning
MSN1, MSN2, ... MSN10	*value*, '*value*' or "*value*" (max. 17 figures)	Own MSNs (multiple subscriber numbers)
NAME	*name*	Name of subscriber number list (see also XLTNG macro) containing all your own MSNs
[SNP1, SNP2, ... SNP10]	HDLC T.70 PPP IDLC X.25M	Assign a subnet protocol (SNP) to an MSN
[SNU1, SNU2, ... SNU10]	NEA TP02 IP X.29 OTHERS	Assign a subnet user protocol (SNU) to an MSN

Table 5: Operands of the XRUF macro

XSNID macro:

Operands	Operand Value	Meaning
ADRTYP	ISDN ISDN-NC X25-ADR	Address type; specifies the type of subnetwork
SUBNID	ISDN-*i*, *i*=1...32 x25-*i*, *i*=1...32	Unambiguous identification for every subnetwork port (subnet ID)

Table 6: Operands of the XSNID macro

XSYSP macro:

Operands	Operand Value	Meaning
Without operands	none	Syntactic start of the KOGS source file

Table 7: Operands of the XSYSP macro

XZSTW macro (only for two-step dialing):

Operands	Operand Value	Meaning
DTEADR	*decimal digit*	Own DTE address, i.e. DTE address of the intermediate system (X.25 main subscriber number)
[FACIL]	*name* (max. 7 characters)	Reference to the XFACI macro
[LPUFADR]	00 20	Identification of the line port (= LPUFADR in the XLTNG macro)
NAME	*name* (max. 8 characters)	Name of the macro. This name must match the entry in the FSS (FACIL object class, x25-description=).
NETZTYP	X25/TYP6 X25/TYP8 X25/TYP9 X25/TYP56 X25/TYP58	Network type of the X.25 network
[PHF]	D B	Channel specification for transfer of X.25 data with X.25 maximum integration (X.31 case B)
[PKANALN]	*a-z* 0≤*a*≤*z*≤4095	Range of numbers for the X.25 logical channels which are reserved for PVCs, only for PHF=D
[RUFNUM]	*value* or '*value*' or "*value*" (max. 17 characters)	Identification of the X.25 node to be dialed. Only for X.25 maximum integration (X.31 case B)

Table 8: Operands of the XZSTW macro

Operands	Operand Value	Meaning
[SKANABG]	*a*-*z* 1≤*a*≤*z*≤4095	Range of numbers for X.25 logical channels to be reserved for outgoing SVCs
[SKANALN]	*a*-*z* 1≤*a*≤*z*≤4095	Range of numbers for X.25 logical channels to be reserved for incoming and outgoing SVCs
[SKANANK]	*a*-*z* 1≤*a*≤*z*≤4095	Range of numbers for X.25 logical channels to be reserved for incoming SVCs

Table 8: Operands of the XZSTW macro

1.2 KOGS macros

This section contains a detailed description of the KOGS macros and their operands. The description is arranged in alphabetical order.

1.2.1 XEND - end KOGS

XEND is the last macro in a KOGS source file.

This macro is mandatory and has no operands.

1.2.2 XFACI - define X.25 facilities and X.25 parameters

The XFACI macro is used to define X.25 facilities and X.25 parameters. The XFACI macro is optional.

X.25 facilities are selectable X.25 features. X.25 parameters are X.25 retry counters and X.25 monitoring periods. The settings for X.25 facilities and X.25 parameters depend on the services offered or requested by the network provider and must be coordinated with the network provider.

The XFACI macro always interacts with the X.25 interface and is thus interrelated with the XLTNG macro (in the case of a direct X.25 port) and the XZSTW macro (in the case of an X.25 interface via two-step dialing).

[**AKFACI**]

The operand is only relevant for SVCs.

You define the behavior relating to reverse charging and Fast Select Acceptance for an incoming call.

= REVCH

Incoming calls with requests for reverse charging are accepted. It is not possible to configure partner-specific exceptions. If the operand value is not specified, incoming calls with requests for reverse charging are only accepted by the partner for whom the charge acceptance of reverse charges was configured in FSS.

FASTSEL

If Fast Select Acceptance has been agreed with the partner, it is set up with this macro. With this setting, the incoming call is displayed including the facility, and then the higher layers have the option of reacting independently of the FSS specification.

If this operand value is not specified, incoming calls requesting the Fast Select facility are rejected with the following message: *Fast Select not subscribed*.

= *list*

list allows multiple naming of the above-listed operands. The operands must be separated by a comma and set in round brackets. At least two operands must be specified, e.g. (REVCH, FASTSEL).

[**DTEADCA**]

Specifies if DTE addresses are to be entered in the call accept packet when an X.25 call is accepted, or defines how the DTE address block is structured in various packets. This specification depends on the network. The correct values can be obtained from the network provider.

= JA (YES)

DTE addresses are transferred and entered into the Call Accepted packet.

If this operand value is not specified, DTE addresses are not entered in the Call Accepted packet.

= TOANPI

The DTE address in the packets must be specified in TOA/NPI format in accordance with the CCITT 1988 standard.

This enables you to specify DTE addresses of up to 17 decimal digits (normally only 15 positions).

The first two digits of the DTE address specify the Type of Address (TOA) and Numbering Plan Information (NPI).

The use of TOA/NPI must be agreed with the network provider.

If this operand value is not specified, DTE addresses are entered into packets in the previous (NON-TOANPI) format, i.e. with a maximum of 15 decimal digits.

= SUPLAD

The local DTE (main) address is suppressed in the connection setup packet. Some networks, e.g. TRANSPAC, do not allow the local DTE address to be entered in the Call Request and Call Accepted packet.

= *list*

list allows multiple naming of the above-listed operands. The operands must be separated by a comma and set in round brackets. At least two operands must be specified, e.g. (TOANPI,JA,SUPLAD).

FACIL

This operand establishes the connection to an XLTNG or XZSTW macro. The name specified here must also be entered in the FACIL operand of one of these macros. Names are freely selectable, but must be different for all specified XFACI macros.

= *name*

Length: ≤ 7 characters
Characters: **A**...**Z**, **0**...**9**, #, @, **$**
First character: not equal to 0...9

[**NUI**]

A Network User Identification (NUI), which is assigned by the network provider, is placed in the Call Request Packet of an outgoing X.25 connection setup. The NUI is used purely for identification.

= *string*

is issued by the network provider.

[**PAKLE**]

You define the receive packet length with this operand. The packet length defines the maximum permissible length of the field for user data per data packet. The value must be agreed with the network provider.

The value given here is the default value for all PVC and SVC of this interface.

= 16...**128**...**2048**

Packet length in bytes. The value is expressed as a power of 2.

[**PAKLS**]

You define the send packet length with this operand. The packet length defines the maximum permissible length of the field for user data per data packet. The value must be agreed with the network provider.

The value given here is the default value for all PVC and SVC of this interface.

= 16...**128**...**2048**

Packet length in bytes. The value is expressed as a power of 2.

[**PAKNUM**]

Packet numbering in modulo 8 or modulo 128 format. The value has to be coordinated with the network provider.

= MOD8

The packets are numbered from 0 to 7.

= MOD128

The packets are numbered from 0 to 127.

[**R20**]

This operand defines the number of times the restart request is to be retried. Retries are carried out after the timeout of the T20 monitoring period. After the timeout of the retry counter, the switched connection is terminated.

= 1...**10**...**128**

Number of retries.

[**R22**]

This operand defines the number of times the reset request is to be retried. Retries are carried out after the timeout of the T22 monitoring period. After the timeout of the retry counter the switched connection is terminated.

= 1...**10**...**128**

Number of retries.

[**R23**]

This operand defines the number of times the clear request is to be retried. The retries are carried out after timeout of the T23 monitoring period. Following the timeout of the retry counter, the channel number is cleared and, if this was the only connection, the switched connection is terminated.

= 1...**2**...**128**

Number of retries.

[**T20**]

This operand defines the length of the waiting period before resending a restart request. The number of retries is limited by the R20 operand.

= 1...**10**...**2048**

Value in seconds.

[**T21**]

This operand defines the length of the waiting period before resending a connection request.

= 1...**<u>200</u>**...**2048**

Value in seconds.

[**T22**]

This operand defines the length of the waiting period before resending a reset request. The number of retries is limited by the R22 operand.

= 1...**<u>10</u>**...**2048**

Value in seconds.

[**T23**]

This operand defines the length of the waiting period before resending a clear request. The number of retries is limited by the R23 operand.

= 1...**<u>10</u>**...**2048**

Value in seconds.

[**T24**]

This operand defines the monitoring period for sending an RR (receive ready) or RNR (receive not ready) packet. This also applies if no acknowledgments are to be sent. (All received data packets are acknowledged.)

If the operand is not specified (or =0) after a maximum of 20 seconds all unacknowledged data packets are acknowledged, but periodical sending of RR and RNR packets is does not occur.

= <u>0</u>...**2048**

Value in seconds.

[**T25**]

This operand defines the monitoring period for the receipt of pending acknowledgments for data packets. The connection is terminated following a timeout.

Time monitoring is initiated whenever a data packet is sent or on switching the window. Time monitoring is terminated when there are no more pending acknowledgments for data packets.

If the operand is given with the value 0 no T25 monitoring occurs.

= 0...**<u>180</u>**...**2048**

Value in seconds.

[**WINDE**]

This operand defines the number of unacknowledged data packets that may be received from the network. The value specified here is the default for all PVCs and SVCs of this interface.

= 1...**2**...**7**

Number of data packets for PAKNUM = MOD8.

= 1...**2**...**127**

Number of data packets for PAKNUM = MOD128.

[**WINDS**]

This operand defines the number of unacknowledged data packets that may be sent into the network. The value specified here is the default for all PVCs and SVCs of this interface.

= 1...**2**...**7**

Number of data packets for PAKNUM = MOD8.

= 1...**2**...**127**

Number of data packets for PAKNUM = MOD128.

See Example 10, Example 11 and Example 12 in this chapter as particularly relevant examples for the XFACI macro.

1.2.3 XLTNG - define line operands

With the XLTNG macro, you define an ISDN switched connection or single channels of an ISDN permanent connection. XLTNG is a mandatory macro.

To some extent, definitions specified here are dependent on agreements with the network provider. In addition, values specified with the UEWEG operand must be coordinated with definitions you specify with the XSNID macro.

[**DTEADR**]

Own DTE address (X.25 main address). Specification of the DTE (main) address is only permitted for X.25 lines. The German PTT also refers to the DTE address as a subscriber number. This operand is mandatory if SVCs are generated, i.e. if at least one of the operands SKANABG, SKANANK, or SKANALN was generated.

= *decimal value*

A whole, positive, decimal number of not more than 15 digits; assigned by the provider of the packet switching data network.

If you have specified XFACI DTEADCA=TOANPI, you may enter DTE addresses of up to 17 decimal digits**.**

[**FACIL**]

Reference to the XFACI macro. Specifies the name of the facilities and parameters for an X.25 port. You must define these facilities and parameters using the XFACI macro:

= *name*

Name specified for the FACIL operand of the XFACI macro.
Length: ≤ 7 characters
Characters: A...Z, 0...9, #, @, $
First character: not equal to 0...9

LPUFADR

You specify the ISDN access connector on the Communications Controller(CC) with this operand. For S_{2M} only one connection per controller is supported.

Number 00 therefore refers to connector 1 and number 20 to connector 2, if it is present. The 20 is a hexadecimal value, equal to decimal 32. The value definition of LPUFADR is being refined for ISDN permanent connections to enable channel information to be passed to the connection concerned. For S_{2M} connections the value of LPUFADR is always 00.

The type of connection must previously have been agreed with your network provider.

Observe the following rules:

– You must define an XLTNG macro for each line definition. Each separate channel of a permanent connection is therefore represented by an XLTNG macro. Either one or two XLTNG macros are required for defining S_0 switched connections, depending on the number of connectors.

– The values for LPUFADR must be assigned in ascending order within the KOGS source file. You must therefore define the XLTNG macro with the lowest LPUFADR value first in the KOGS source file.

– Ensure that the LPUFADR values are compatible with the corresponding UEWEG operand values.

– Input hexadecimal values for LPUFADR in the KOGS source file.

Assigning values for ISDN switched connections:

The following values are possible for LPUFADR:

= 00

The ISDN switched connection is connected to connector 1.

= 20

The ISDN switched access is connected to connector 2. This value is not permitted for S_{2M} connections.

Assigning values for ISDN permanent connections:

You can use the B and D-channels with permanent connections. The network providers offer various combinations of B and D-channels for one S_0 connection. The Deutsche Telekom currently offers the following variants per ISDN connection:

– Use of one B-channel

– Use of one B-channel and one D-channel

– Use of two B-channels and one D-channel

All channels of a permanent connection lead to the same partner.

The following values are possible for LPUFADR:

= 00

The ISDN permanent connection is on connector 1. All operand values assigned in this XLTNG macro relate to the D-channel of this ISDN permanent connection.

= 01

The ISDN permanent connection is on connector 1. All operand values assigned in this XLTNG macro relate to the B_1-channel of this ISDN permanent connection.

= 02

The ISDN permanent connection is on connector 1. All operand values assigned in this XLTNG macro relate to the B2-channel of this ISDN permanent connection.

= 20

The ISDN permanent connection is on connector 2. All operand values assigned in this XLTNG macro relate to the D-channel of this ISDN permanent connection.

= 21

The ISDN permanent connection is on connector 2. All operand values assigned in this XLTNG macro relate to the B1-channel of this ISDN permanent connection.

= 22

The ISDN permanent connection is on connector 2. All operand values assigned in this XLTNG macro relate to the B2-channel of this ISDN permanent connection.

[**MLNK**]

This operand is only allowed for defining a permanent connection channel without X.25.

MLNK is used to define a multilink (channel grouping) for permanent connections without X.25. Multilink is used to group different channels of the S_0 permanent connection together to form a single virtual channel. This increases both the transfer rate and reliability of the permanent connection. Switched connections must not be described in KOGS.

You define the group number to which the channels belong with the MLNK operand.

– If you have two S_0 permanent connections available and use the above recommendation, a maximum of six channels can be connected as a group from your computer to an ISDN partner. The

two S_0 permanent connections must, however, go to the same partner. If the two S_0 permanent connections go to different partners, you can define a maximum of two groups with three channels each. You must then assign each of the two groups a different number with MLNK.

– If you only have one S_0 permanent connection and use the above recommendation, you can only define one group with three channels from your computer to an ISDN partner.

– Grouped channels must use the same subnet ID (see macro XSNID on page 41).

= 1...9
Group number value range.

[**PHF**]
This operand is optional and only permitted when an ISDN connection has X.25 maximum integration available.

With this operand you specify for which ISDN channels you wish to use maximum integration.

= D
Maximum integration functions (X.31 case B) are available in the D-channel. This entry is only permitted for S_0 connections.

= B
Maximum integration functions (X.31 case B) are available in the B channel.

= DB
Maximum integration functions (X.31 case B) are available in the D-channel and B-channel. This value is only permitted for S_0 connections.

The values must correspond with the values of the PHF operands in the macro XZSTW.

[**PKANALN**]
This operand is optional and only permitted for permanent connections using X.25. You define a number range of X.25 logical channels that are to be reserved for permanent virtual circuits (PVC) with this operand.

If PKANALN is not specified, no channel is provided for PVCs.

= *a*-*z*

0≤*a*≤*z*≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (PKANALN < SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– Only in a few networks is it allowed to use channel number 0 (e.g. TRANSPAC).

– The range of PVC numbers must be configured identically on both systems for DTE/DCE or DTE/DTE connections, but without channel number 0.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

[**RUFNUM**]

This operand is only permitted for switched connections and is mandatory if the German national ISDN D-channel signaling protocol 1TR6 is used. This operand is mandatory for S_{2M} connections.

With Euro-ISDN for S_0 connection you must assign a value to either the RUFNUM or RUFVERZ operand in the XLTNG macro. You must ensure that you only assign a value to one of the above operands and not both, if you are using Euro-ISDN.

You input your own ISDN subscriber number, which is assigned by the network provider, for RUFNUM. You must also include the terminal selection digit (EAZ) If the 1TR6 D-channel signaling protocol is used.

For switched connections with Euro-ISDN (signaling protocol DSS1) the value “0” has this meaning: For incoming calls your own ISDN-number will not be checked.

= value**,** **‘**value**’** or **“**value**”**

ISDN subscriber number, 17 digits maximum, without special characters or access code.

[RUFPAUS]

This operand defines the length of the waiting period between two call retries if an outgoing call was unsuccessful. Only permitted for a dial-up line.

= 5...**10**...**40**

Pause time in seconds

[**RUFVERZ]**

This operand is only permitted for Euro-ISDN. It is mandatory if you do not use the RUFNUM operand in the XLTNG macro. This operand can only be used with S_0 connections.

With Euro-ISDN, you must assign a value to either the RUFNUM or RUFVERZ operand in the XLTNG macro. You must ensure that you only assign a value to one of the above operands and not one to each, if you are using Euro-ISDN.

Use of this operand is only meaningful if your network provider has assigned more than one multiple subscriber number (MSN) to you.

With this operand, you specify the name of a list containing all subscriber numbers (MSNs) for the connection you describe with the superordinate XLTNG macro.

= name

Input a name for the subscriber number list.
Length: ≤ 8characters
Characters: A...Z, 0...9, #, @, $
First character: not equal to 0...9

[**RUFWDH**]

This operand defines the number of redial attempts if an outgoing call was unsuccessful. Only permitted for a dial-up line.

= 0...**8**

Number of redial attempts.

[**SKANABG**]

Only permitted for permanent connections using X.25 (XLTNG/UEWEG= X25/TYP...). This operand defines the range of logical channels to the X.25 network which are used for SVCs and where only outgoing connections are possible. All incoming connection setup requests are rejected in order that these channels remain free for outgoing calls.

If SKANABG is not specified, no channels are reserved exclusively for outgoing connections.

= *a*-*z*

1≤*a*≤*z*≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (PKANALN < SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– The range of numbers must be configured as SKANANK on the partner system for DTE/DCE or DTE/DTE connections.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

[**SKANALN**]

Only permitted for permanent connections using X.25 (XLTNG/UEWEG=X25/TYP...). This operand defines the range of logical channels to the X.25 network which are used for SVCs and where both incoming and outgoing connections are possible.

If SKANALN is not specified, no channels are reserved exclusively for incoming and outgoing connections.

= *a*-*z*

1≤*a*≤*z*≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (PKANALN < SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– The range of numbers must be configured identically on both systems for DTE/DCE or DTE/DTE connections.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

[SKANANK]

Only permitted for permanent connections using X.25 (XLTNG/UEWEG=X25/TYP...). This operand defines the range of logical channels to the X.25 network which are used for SVCs and where only incoming connections are possible. All outgoing connection setup requests are rejected in order that these channels remain free for incoming calls.

If SKANANK is not specified, no channels are reserved exclusively for incoming connections.

= *a*-*z*

1≤*a*≤*z*≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (PKANALN < SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– The range of numbers must be configured as SKANABG on the partner system for DTE/DCE or DTE/DTE connections.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

[SNP]

You can use the SNP operand to assign a default subnet protocol either to each channel of an ISDN permanent connection or to a complete ISDN connection. The subnet protocol defines the protocols to be used on layers 2 and 3 for the specified line. The layer 2 and 3 protocols are then set for all connections on this line.

The available values for SNP can be found in table 9.

SNP	Protocol layer 3	Protocol layer 2
HDLC	-	HDLC-BAC
T.70	T.70-3	HDLC-BAC
PPP	-	PPP
IDLC	-	IDLC
X.25M	X.25	HDLC-LAPB

Table 9: SNP protocol layers

Observe the following rules:

– If you group channels, all channels in the group must use the same SNP.

– Connections with the same subnet ID (see macro XSNID) must use the same value for SNP.

– If you assign a value for SNP, you are restricted in the values you can use for the subnet user protocol (SNU). Only specific combinations are allowed for the SNP and SNU protocols. Information on the permitted combinations can be found in table 10.

– All applications using the subnet protocol X.25M can work alternatively or parallel with X.25 maximum integration, if the interface is enabled for it.

Applications	SNU	SNP
NEA	NEA	HDLC
NEA	NEA	X.25M
OSI	TP02	X.25M
OSI	TP02	T.70
TCP/IP	IP	X.25M
TCP/IP	IP	T.70
TCP/IP	IP	HDLC
TCP/IP	-	PPP
X.29	X.29	X.25M

Table 10: SNU and SNP protocol combinations

Applications	**SNU**	**SNP**
OTHERS	OTHERS	X.25M
SNA	-	IDLC

Table 10: SNU and SNP protocol combinations

= HDLC
: Uses the data protection protocol HDLC-BAC (HDLC-Balanced) on layer 2 and no protocol on layer 3.

= T.70
: Uses the data protection protocol HDLC-BAC (HDLC-Balanced) on layer 2 and T.70-3 on layer 3.

= PPP
: Used to set the point-to-point protocol, which offers interoperability between devices of two different (external) systems by means of encapsulation. The HDLC data protection protocol on layer 2 does not exist in this case and no layer 3 protocol is used.

= IDLC
: Uses the IDLC (ISDN Data Link Control; standardized by IBM) on layer 2 and no protocol on layer 3.

= X.25M
: Used to set X.25 minimum integration (X.31 case A). X.25M uses the HDLC-LAPB protocol (data protection protocol as standardized for X.25) on layer 2 and the X.25 protocol on layer 3.

[SNU]
: You can use the SNU operand to assign a subnet user protocol (SNU) either to each channel of an ISDN permanent connection or to a complete ISDN connection. The user protocol defines the protocols to be used on layers above OSI layer 3 for the specified line. The protocols above OSI layer 3 are set for all connections on this line.

Information on the available values used above OSI layer 3 during the connection can be found in table 11.

SNU	**Protocols above OSI layer 3**
NEA	NEATE/NEAN
TP02	ISO 8073 cl2/0
IP	TCP/IP
X.29	X.29
OTHERS	other protocols via X.25

Table 11: SNU protocol layers

Observe the following rules:

– If you group channels, all channels in the group must use the same SNU.

– Connections with the same subnet ID (see macro XSNID) must use the same value for SNU.

– If you have also assigned a value for SNP, you are restricted in the values you can use for SNU. Only specific combinations are allowed for the SNU and SNP protocols. Information on the permitted combinations can be found in table 10 on page 29.

= NEA

Uses the NEATE/NEAN protocol for TRANSDATA networks above OSI layer 3.

= TP02

Uses the ISO 8073 cl2/0 protocol above OSI layer 3.

= IP

Uses the TCP/IP protocol above OSI layer 3.

= X.29

Uses the X.29 protocol above OSI layer 3.

= OTHERS

Defines an user or application that uses a private protocol via X.25.

[**UEKONF**]

With this operand, you define the configuration of your ISDN connection agreed with your network provider. A distinction is made between point-to-point and ISDN bus connections.

S_{2M} connections can only be configured as point-to-point connections.

– Up to 12 ISDN devices can be connected to a single S_0 bus connection. This connection is also known as point-to-multipoint.

– Only one terminal device may be connected to an S_0 connection if it is configured as a point-to-point or S_{2M} connection. ISDN permanent connections are always point-to-point.

= PZP

Point-to-point connection.

= BUS

S_0 bus access (point-to-multipoint connection)

[**UEPROZ**]

A transfer protocol is specified in the ISO data protection layer 2 with this operand.

This specification is only effective for the D-channel transfer protocol of an ISDN switched connection. The transfer protocol for the B-channels is negotiated and set connection-specific.

For ISDN permanent connection channels, the transfer protocol for the B-channels is also set according to the value you specified for the UEPROZ operand.

The following values can be specified for UEPROZ:

=HDLC/BAC

HDLC-BALANCED procedure variant; default setting for ISDN permanent connections (UEWEG=ISDN-FV).

= HDLC/LAPB

HDLC procedure variant for packet-switched networks; this value is specified for ISDN permanent connections using X.25 (UEWEG=ISDN-FVX25/TYP...).

= HDLC/LAPD

HDLC-LAPD procedure variant without Terminal Endpoint Identifiers negotiation (TEI value is set to “0”); this value may only be assigned for switched connections with point-to-point configuration (UEKONF=PZP).

= HDLC/LAPD-TEI

HDLC-LAPD procedure variant with Terminal Endpoint Identifiers (TEI) negotiation; this value has to be specified for ISDN switched connections (UEWEG=ISDN-S0[/TYP...]) with bus configuration (UEKONF=BUS).

= Q.922

Defines the IDLC variant of HDLC (IBM ISDN-HDLC).

This is only possible for UEWEG=ISDN-FV.

= HDLC/FRAMING

Defines that no transfer protocol is set in ISO security layer (layer 2).

This is only possible for permanent connections.

This is the default for ISDN permanent connection with Point-to-Point Protocol (SNP=PPP).

[**UEWEG**]

You use this operand to define the ISDN connection‘s operating mode you require. You can choose between:

– S_0 switched connection
– S_0 permanent connection
– S_{2M} switched connection

For an S_0 connection, you must decide whether you want to operate the ISDN connection as a permanent or switched connection.

The defined transmission path must correspond with settings that you make with the XSNID macro.

– For a switched connection, the UEWEG operand must be set to ISDN-S0/TYP... and you must simultaneously define the ISDN signaling protocol (Euro-ISDN or 1TR6) you want to use for this switched connection.

– For a permanent connection, the UEWEG operand must be set to ISDN-FV... and you must simultaneously define whether you want to use the X.25 protocol or not.

For an S_{2M} connection the operand value ISDN-S2 must be specified for UEWG.

= ISDN-FV
ISDN permanent connection channel without X.25 protocol.

= ISDN-FVX25/TYP5
Network interface via an ISDN permanent connection channel using the X.25 protocol according to CCITT 1980. The local system is an end system (DTE). Note that the own DTE address is not to be entered in sent call packets, e.g. for an interface to TRANSPAC packet switching network in France.

= ISDN-FVX25/TYP6
Network interface via an ISDN permanent connection channel using an X.25 protocol according to CCITT 1980. The local system is an end system (DTE), e.g. for an interface to DATEX-P/80 or to a X25/TYP56 X.25 system.

= ISDN-FVX25/TYP8
Network interface via an ISDN permanent connection channel using an X.25 protocol according to CCITT 1984 or 1988. The local system is an end system (DTE), e.g. for an interface to DATEX-P/84 or to a X25/TYP58 X.25 system.

= ISDN-FVX25/TYP9
ISDN permanent connection channel using an X.25 protocol according to ISO 8028. (The transmission path does not use the X.25 network.) It is negotiated with the communication partner, who acts as both DTE and DCE. For an interface to a X25/TYP9 X.25 system (DTE-DTE link).

= ISDN-FVX25/TYP56
ISDN permanent connection channel using an X.25 protocol according to CCITT 1980. (The transmission path does not use the X.25 network.) The local system plays the part of a DCE. For an interface to a X25/TYP6 X.25 system (DTE-DCE link).

= ISDN-FVX25/TYP58
ISDN permanent connection channel using an X.25 protocol according to CCITT 1984 or 1988. (The transmission path does not use the X.25 network.) The local system plays the part of a DCE. For an interface to a X25/TYP8 X.25 system (DTE-DCE link).

= ISDN-S0/TYP01

S_0 switched connection using the D-channel 1TR6 protocol. Two service indicators are used:

– the service indicator “X.21 service” for data connections without X.25 protocol

– the service indicator “DUE transparent” for data connections using the X.25 protocol

= ISDN-S0/TYP01A

S_0 switched connection using the D-channel 1TR6 protocol. Two service indicators are used:

– the service indicator “X.21 service” for data connections using the X.25 protocol

– the service indicator “DUE transparent” for data connections without X.25 protocol

= ISDN-S0/TYP03

S_0 switched connection using the D-channel DSS1 protocol (Euro-ISDN).

= ISDN-S2

S_{2M} switched connection using the D-channel protocol DSS1 (Euro-ISDN).

[**VUEZEIT**]

This operand defines the connection monitoring period for dial-up connections. Only relevant if the subnetwork profile is used via the NEA TSP (transport service provider), i.e. for WAN-NEA and WAN-NX25.

Specifies how long the connection is to be monitored between messages. If neither data nor control messages are registered during this monitoring period, the selected subnetwork connection is cleared.

= 0

No monitoring occurs.

= 1...**24**...**127**

Value specified in seconds. The VUEZEIT should never be less than 24 seconds by default.

The value for VUEZEIT should be high enough to ensure the transfer of at least one data unit by the HDLC, i.e. including possible retries in the HDLC **and** the transmission of an HDLC acknowledgment. For lower

values, unnecessary retries for data are to be expected, which means that connections that are cleared as a result of VUEZEIT will need to be re-established. In the worst case scenario, the transport connection will be cleared, since the partner can no longer be reached.

X25TEI

This entry is only permitted and necessary if X.25 maximum integration (X.31 case B) in the D-channel is available for the ISDN connection.

This operand is used to specify the Terminal Endpoint Identifier (TEI). The TEI is the “X.25 user in D-channel” ID by which you are known in the ISDN switching centre. The TEI is issued to you by the network provider.

= decimal digit

Decimal digit from **1**-**63**.

> > > see Example 1, Example 2, Example 4, Example 6 and Example 9 in this chapter as particularly relevant examples for the XLTNG macro.

1.2.4 XRUF - define subscriber number list

This macro is only useful if multiple subscriber numbers (MSN) are used. They can only be assigned by the network provider for Euro-ISDN. The XRUF macro describes a subscriber number list of MSNs.

To the individual multiple subscriber numbers (MSNi, i=1,...,10) you can assign subnet user protocols (SNUi, i=1,...,10) and/or subnet protocols (SNPi, i= 1,...,10). The assignment of SNUs and SNPs to MSNs has the following effect for

– incoming connection setups to an application:
  The called subscriber number MSNi is searched in the subscriber number list. Furthermore the protocol stack defined by the assigned SNUi and/or the assigned SNPi is set if the signaling contains no other definition and if no information can be found in the FSS.

– outgoing connection setups from an application:
  The sender‘s subscriber number is taken from the subscriber number list. The outgoing connection setup is defined by SNU and SNP (see table 10 on page 29). SNU and SNP are sequentially compared with SNUi and SNPi. The sender‘s subscriber number is that number which is found first at the following steps:

  1. The first MSNi with correspondence between SNU + SNP and SNUi + SNPi.
  2. The first MSNi with correspondence between SNU and SNUi. Only MSNi without assigned SNPi are checked.
  3. The first MSNi with correspondence between SNP and SNPi. Only MSNi without assigned SNUi are checked.
  4. The first MSNi without either an assigned SNUi or an assigned SNPi.
  5. MSN1.

MSN1, **MSN2**, ... **MSN10**

Your own multiple subscriber numbers are defined with this operand. You are then reachable under each of these numbers. The MSNs for your connection are assigned by your network provider.

Observe the following rules:

– the SNP and/or SNU are assigned to an MSN using a common index. The MSN index (e.g. MSN4) then matches the SNP (SNP4) / SNU (SNU4) indices.

– The indices for MSN must be given as consecutive values beginning with 1.

– It is not mandatory to assign an SNP and/or SNU to each MSN.

= value, **'**value**'** or **"**value**"**

Multiple subscriber number (MSN); positive, whole decimal number with a maximum of 17 digits.

NAME

With this operand, you define the name of a subscriber number list containing all your own MSNs.

The name assigned to the RUFVERZ operand in the XLTNG macro must be identical to that assigned to the NAME operand in the XRUF macro.

= name

Name of the ISDN subscriber number list.
Length: ≤ 8 characters
Characters: **A**..**Z**, **0**..**9**, #, @, **$**
First character: not equal to 0...9

[**SNP1**, **SNP2**, ... **SNP10**]

You can assign a default subnet protocol to an MSN with this operand. The subnet protocol defines the protocols used on layers 2 and 3.

When the MSNi is called the assigned SNPi is used if the signaling contains no other definition and no information can be found in the FSS.

The subnet protocol specified here is compared with the subnet protocol which is defined in the outgoing connection setup to define the sender's subscriber number from the subscriber number list.

The table 9 on page 29 shows the values available for SNPi.

Observe the following rules:

– The MSN that you assign an SNP to here must be defined with the MSN operand within the XRUF macro.

– The SNP and/or SNU are assigned to an MSN using a common index. The MSN index (e.g. MSN4) then matches the SNP (SNP4) / SNU (SNU4) indices.

– If you have assigned both an SNP and SNU to the same MSN, you are restricted in the values you can use for SNP and SNU. Only specific combinations are allowed for the SNU and SNP protocols. Information on the permitted combinations can be found in table 10 on page 29.

= HDLC
: Uses the data protection protocol HDLC-BAC on layer 2 and no protocol on layer 3.

= T.70
: Uses the data protection protocol HDLC-BAC on layer 2 and the T.70-3 protocol on layer 3.

= PPP
: Used to set the point-to-point protocol, which offers interoperability between devices of different (external) systems by means of encapsulation. The HDLC data protection protocol on layer 2 does not exist in this case and no layer 3 protocol is used.

= IDLC
: Uses the IDLC (ISDN Data Link Control; standardized by IBM) on layer 2 and no protocol on layer 3.

= X.25M
: Used to set X.25 minimum integration (X.31 case A). X.25M uses the HDLC-LAPB protocol (data protection protocol as standardized for X.25) on layer 2 and the X.25 protocol on layer 3.

[**SNU1**, **SNU2**, ... **SNU10**]
: You can assign a default subnet user protocol to an MSN with this operand. The subnet user protocol defines the protocol used above OSI layer 3 during the connection.

When an MSN is called the assigned SNU is used if the ISDN signaling contains no other definition and there is no other information in the FSS.

The subnet user protocol specified here is compared with the subnet user protocol which is defined in the outgoing connection setup to define the sender‘s subscriber number from the subscriber number list.

The table 11 on page 31 shows the values available for SNUi.

Observe the following rules:

– The MSN that you assign an SNU to here must be defined with the MSN operand within the XRUF macro.

– The MSN index (e.g. MSN4) must match the index of the assigned SNU (SNU4).

– If you have assigned both an SNP and SNU to the same MSN, you are restricted in the values you can use for SNP and SNU. Only specific combinations are allowed for the SNU and SNP protocols. Information on the permitted combinations can be found in table 10 on page 29.

= NEA
Uses the NEATE/NEA protocol for TRANSDATA networks.

= TP02
Uses the ISO 8073 cl2/0 protocol.

= IP
Uses the TCP/IP protocol.

= X.29
Uses the X.29 protocol.

= OTHERS
Defines a user or application that uses a private via X.25.

> > > see examples Example 6, Example 7 and Example 12 in this chapter as particularly relevant examples for the XRUF macro

1.2.5 XSNID - define local subnetwork interface

The XSNID macro describes a local subnetwork interface.

A subnetwork is an independent unit of systems for communication purposes.

A subnetwork interface is the access to a subnetwork. Each Communications Controller (CC) has one or more subnetwork interface.

Each subnetwork interface is defined by two characteristics: the type of subnetwork and a unique ID.

– The type of subnetwork can be defined as a subnetwork using permanent connection(s), with or without X.25 protocol, or using switched connection(s). A single B-channel of a permanent connection can therefore also be seen as a subnetwork interface. The definitions are assigned with the ADRTYP parameter.

– The subnetwork identification number provides a unique ID and is defined with the SUBNID parameter.

A route to a remote network address through a network is determined by a specific method when a connection is set up,. The local subnetwork interface is the route start point and the end point is the subnetwork address of the remote system or the closest interconnection system.

No distinction must be made between routes with equivalent start and end points. It is also not necessary to define different subnetwork interfaces in this case.

All lines of a permanent connection using grouped channels (multilink) must belong to the same subnetwork interface.

ADRTYP

You use this operand to define the type of subnetwork to which the subnetwork interface belongs. A subnetwork can be either an ISDN switched connection or an ISDN permanent connection with or without X.25 protocol.

The type of subnetwork that you define here must be consistent with the line definitions in the corresponding XLTNG macro(s).

= ISDN-NC

ISDN permanent connection (ISDN Nailed Connection).

Only the ISDN-NC address type is permitted if the subnetwork access consists of one or more ISDN permanent connections without X.25 protocol.

= X25-ADR

ISDN permanent connection using the X.25 protocol.

Only the X25-ADR address type is permitted if the subnetwork access consists of one or more ISDN permanent connections using the X.25 protocol.

= ISDN

ISDN switched network.

Only the address type ISDN is permitted if the subnetwork access consists of an ISDN switched connection.

SUBNID

This operand is used to define a local subnetwork ID for each subnetwork interface. A subnetwork interface consists of one or more lines of the same type. The subnetwork ID identifies one subnetwork interface or a group of them that can be accessed under this number. If one or more subnetwork interfaces lead into the same subnetwork, they can be assigned the same subnetwork ID. You then leave it to the system to select the outgoing subnetwork interface with an active connection setup. You can assign a maximum of 32 subnetwork IDs.

= ISDN-i, i = **1**...**32**

These are subnetwork accesses via ISDN switched connections or ISDN permanent connections without X.25.

= X25-i, i = **1**...**32**

These are subnetwork accesses via ISDN permanent connections using the X.25 protocol.

> > > see Example 4 and Example 9 in this chapter as particularly relevant examples for the XSNID macro

1.2.6 XSYSP - open KOGS

XSYSP is the first call in a KOGS source file. It is a mandatory macro.

The XSYSP macro has no operands.

1.2.7 XZSTW - defining X.25 access with ISDN dialing

The XZSTW macro defines the X.25 attributes of a network change from a circuit-switched network to an X.25 network. The XZSTW macro is only relevant for two-step dialing and must hence be specified only in that case. You can use the same macro XZSTW for both S_0 connections on a CC.

The ISDN network is a line-switched network that provides a physical line. It is nevertheless also possible to send data packets over this ISDN connection.

CCP-ISDN supports three different options for X.25 communication:

- connection to ISDN partner with X.25 communication in the B-channel (DTE-DTE connection). The partners are connected by ISDN and communicate in the B-channel according to the X.25 protocol (case 1).
- connections to partners in a public or private X.25 network with minimum integration according to X.31 case A (case 2).
- connection to partners in a public or private X.25 network with the maximum integration according to X.31 case B (case 3).

DTEADR

Own DTE (main) address, i.e. the DTE address of the intermediate system (also called an Interworking Unit) to the X.25 network. The German PTT also refers to the DTE address as the subscriber number.

Case 1: Dummy address for the X.25 protocol; agreed between the subscribers.

Case 2 and 3: Issued by network provider.

= *decimal number*

Decimal number of up to 15 digits; assigned by the provider of the packet switching network.

If you have specified XFACI DTEADCA=TOANPI, you may enter DTE addresses of up to 17 decimal digits.

[**FACIL**]

Reference to an XFACI macro; specifies the name of the facilities and parameters for X.25 access. These facilities and parameters must be defined with the XFACI macro.

= *name*

Name that was specified in the FACIL operand of the XFACI macro.
Length: ≤ 7 characters
Characters: **A**...**Z**, **0**...**9**, #, @, **$**
First character: not equal to 0...9

[**LPUFADR**]

Specifies the identification of the line port, which must already be defined in the XLTNG macro. The referenced line must be in the same subnetwork. This operand is required to enable the selection of a line for network access in the case of grouped or bundled ports. The value specified here must be the same as the one set for LPUFADR in the associated XLTNG macro.

= 00, **20**

NAME

This operand is used to name the description of the X.25 access.This name must match the x25-description attribute of the FACIL object in the FSS, if a reference is to be made to this X.25 access description.

= *name*

Length: ≤ 8characters
Characters: **A**...**Z**, **0**...**9**, #, @, **$**
First character: not equal to 0...9

NETZTYP

This operand defines the X.25 variant to be used for two-step dialing.

= X25/TYP6

Network interface that runs with an X.25 protocol as defined in CCITT 1980. The local system is an end system (DTE), e.g. for two-step dialing to DATEX-P/80 or to a X25/TYP56 X.25 system.

= X25/TYP8

Network interface that runs with an X.25 protocol as defined in CCITT 1984 or 1988. The local system is an end system (DTE), e.g. for two-step dialing to DATEX-P/84 or to a X25/TYP58 X.25 system.

= X25/TYP9

Linkage with an X.25 system that runs with an X.25 protocol as defined in ISO standard 8208. (The transmission path does not use the X.25 network.) It is negotiated with the communication partner, who acts as both DTE and DCE. For two-step dialing to a X25/TYP9 X.25 system (DTE-DTE link).

= X25/TYP56

Linkage with an X.25 system that runs with an X.25 protocol as defined in CCITT 1980. (The transmission path does not use the X.25 network.) The local system plays the part of a DCE. For two-step dialing to a X25/TYP6 X.25 system (DTE-DCE link).

= X25/TYP58

Linkage with an X.25 system that runs with an X.25 protocol as defined in CCITT 1984 or 1988. (The transmission path does not use the X.25 network). The local system plays the part of a DCE. For two-step dialing to a X25/TYP8 X.25 system (DTE-DCE link).

[**PHF**]

This operand is mandatory if the X.25 access description is used for a maximum integration (X.31 case B).

You use this operand to specify which channels the X.25 access description is valid for.

= D

Functions of maximum integration (X.31 case B) is available in the D-channel. This specification is only permitted for S_0 connections.

If the PHF=D or PHF=DB parameter has been set in the XLTNG macro, there must be a XZSTW macro with the parameter PHF=D.

= B

Function of maximum integration (X.31 case B) is available in the B-channel.

If the PHF=B or PHF=DB parameter has been set in the XLTNG macro, there must be a XZSTW macro with the parameter PHF=B per B-channel.

[**PKANALN]**

Only permitted if there is X.25 maximum integration (X.31 case B) in the D-channel. You use this operand to specify a number range of the X.25 logical channels, which should be reserved for PVCs (Permanent Virtual Circuit).

If PKANALN is not specified, no channel is provided for PVCs.

= *a*-*z*

0≤a≤z≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (PKANALN < SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– Only in a few networks is it allowed to use channel number 0 (e.g. TRANSPAC).

– The range of PVC numbers must be configured identically on both systems for DTE/DCE or DTE/DTE connections, but without channel number 0.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

[**RUFNUM**]

This operand must only be specified if the DTE address given by the network provider is not included in the series of numbers belonging to the ISDN connection.

You use this operand to specify the subscriber number with which the system identifies itself to the PABX at the setup of the X.25 maximum integration (X.31 case B) ISDN connection. The number is distributed by the network provider.

= value or **'**value**'** or **"**value**"**

17 digits maximum, without area code

The meaning of this operand is different from earlier versions of CCP-ISDN.

[**SKANABG**]

You use this operand to specify a number range for X.25 logical channels which are used for SVCs and where only outgoing connections are possible. All incoming connection setup requests are rejected in order that these channels remain free for outgoing calls.

If SKANABG is not specified, no channels are reserved exclusively for outgoing connections.

= *a***-***z*

1≤a≤z≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– The range of numbers must be configured as SKANANK on the partner system for DTE/DCE or DTE/DTE connections.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

Please note the following relationship when specifying the user-defined number of SVCs via a B-channel:

The sum of the values of SKANABG and SKANALN defines the maximum number of SVCs via a B-channel. This maximum number can be reduced by means of the FSS parameter *x31min-svc-to-Bchan*.

[**SKANALN**]

You use this operand to specify a number range for X.25 logical channels which are used for SVCs and where both incoming and outgoing connections are possible.

If SKANALN is not specified, no channels are reserved exclusively for incoming and outgoing connections.

= *a-z*

1≤a≤z≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– The range of numbers must be configured identically on both systems for DTE/DCE or DTE/DTE connections.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

Please note the following relationship when specifying the user-defined number of SVCs via a B-channel:

The sum of the values of SKANABG and SKANALN defines the maximum number of SVCs via a B-channel. This maximum number can be reduced by means of the FSS parameter *x31min-svc-to-Bchan*.

[**SKANANK**]

You use this operand to specify a number range for X.25 logical channels which are used for SVCs and where only incoming connections are possible. All outgoing connection setup requests are rejected in order that these channels remain free for incoming calls.

If SKANANK is not specified, no channels are reserved exclusively for incoming connections.

= *a*-*z*

1≤a≤z≤**4095**

Observe the following rules:

– The channel range is distributed by the network provider.

– The channel ranges are put in order and must not overlap (SKANANK < SKANALN < SKANABG). However, at least one of the operands must be specified.

– The range of numbers must be configured as SKANABG on the partner system for DTE/DCE or DTE/DTE connections.

– The total number of all channels should not be greater than the released number of simultaneous transport connections.

> > > see Example 7, Example 10 and Example 12 in this chapter as relevant examples for the XZSTW macro

1.3 Examples

This section contains various examples of configuration files.

The parameters SNP and SNU are used exemplarily. They are only useful as default parameters in case of insufficient signaling and missing partner entries in the FSS. For ISDN switched connections you can do without these parameters in most cases.

> > > This character string was used in the preceding macro descriptions to refer to separate configuration file examples that are particularly relevant for the macro concerned.

< < < This character string is used in the following examples to refer to topics that are shown as examples in the configuration file concerned.

Example 1

< < < Configuration of a permanent connection (without X.25)

< < < Configuration of interface

< < < Uses a B-channel

```
XSYSP
XSNID     SUBDNID = ISDN-1,
          ADRTYP = ISDN-NC

XLTNG     LPUFADR = 01,
          UEWEG = ISDN-FV,
          SNU = NEA,
          UEKONF = PZP
XEND
```

This example shows the configuration of an ISDN permanent connection. Only the transfer capacity of the first B-channel is therefore available to the S_0 connection. This is the standard permanent connection “Digital 64S”. The UEKONF operand is set to PZP because point-to-point connection is a

mandatory requirement for permanent connections. The NEA protocol is used above OSI layer 3 during the connection (SNU = NEA). By default, NEA uses the HDLC-BAC subnetwork protocol.

Example 2

< < < Configuration of an S_{2M} switched connection using Euro-ISDN

< < < Configuration of interface

```
XSYSP
XSNID     ADRTYP = ISDN,
          SUBNID = ISDN-1

XLTNG     LPUFADR = 00,
          UEWEG = ISDN-S2
          RUFNUM = 12345,
          UEKONF = BUS
XEND
```

This example shows the definition of the S_{2M} switched connection. The transfer route UEWEG is correspondingly defined as ISDN-S2 (Euro-ISDN). The ISDN subscriber number 12345 is assigned to the connection by the network provider.

Example 3

< < < Configuration of a permanent connection

< < < Using SNU

< < < Transfer route

```
XSYSP
XSNID     ADRTYP = ISDN-NC,
          SUBNID = ISDN-1
```

```
XLTNG     LPUFADR = 00,
          SNU = TP02,
          UEKONF = PZP,
          UEWEG = ISDN-FV

XLTNG     LPUFADR = 01,
          SNU = TP02,
          UEKONF = PZP,
          UEWEG = ISDN-FV

XLTNG     LPUFADR = 02,
          SNU = TP02,
          UEKONF = PZP,
          UEWEG = ISDN-FV
XEND
```

The S_0 connection was defined as a permanent connection using both B-channels and the D-channel for ISO applications. The transfer route UEWEG for each of the channels is therefore configured as a permanent connection. Three possible connections are available to the same partner for the subnet user protocol TP02.

TP02 uses the subnet protocol T.70 by default.

Example 4

< < < Configuration of switched and permanent connections on a CC

```
XSYSP
XSNID     ADRTYP = ISDN,
          SUBNID = ISDN-1

XLTNG     LPUFADR = 00,
          UEKONF = BUS,
```

```
            RUFNUM = 12345,
            UEWEG = ISDN-S0/TYP03

XSNID       ADRTYP = ISDN-NC,
            SUBNID = ISDN-2

XLTNG       LPUFADR = 20,
            SNU = TP02,
            UEKONF = PZP,
            UEWEG = ISDN-FV

XLTNG       LPUFADR = 21,
            SNU = TP02,
            UEKONF = PZP,
            UEWEG = ISDN-FV

XLTNG       LPUFADR = 22,
            SNU = TP02,
            UEKONF = PZP,
            UEWEG = ISDN-FV
XEND
```

Two accesses are configured. The first S_0 connection is configured as a switched connection. The transfer route UEWEG was correspondingly defined as ISDN-S0/TYP03.

The second S_0 connection is defined as a permanent connection using both B-channels and the D-channel. The transfer routes of the separate permanent connections are correspondingly configured as permanent connections.

Because both a switched connection (connector 1) and a permanent connection (connector 2) were configured on the Communications Controller in the example, each connection leads to a different subnetwork. A separate subnetwork ID must therefore be defined for each of these accesses.

Example 5

< < < Multilink
< < < SNU and SNP using multilink
< < < Transfer route using multilink
< < < Subnetwork interface using multilink

```
XSYSP
XSNID     SUBNID = ISDN-1,
          ADRTYP = ISDN-NC

XLTNG     LPUFADR = 01,
          MLNK = 1,
          UEWEG = ISDN-FV,
          UEPROZ = HDLC/BAC,
          SNU = NEA,
          UEKONF = PZP

XLTNG     LPUFADR = 02,
          MLNK = 1,
          UEWEG = ISDN-FV,
          UEPROZ = HDLC/BAC,
          SNU = NEA,
          UEKONF = PZP
XEND
```

This example shows the definition of a permanent connection. It uses the two permanent connection B-channels on connector 1 for data transfer. The two channels are grouped (MLNK = 1) and therefore form a single virtual line. The same subnet user protocol (SNU = NEA) must be defined for both channels because the channels are grouped. Only one subnetwork interface may be defined in this case, because both lines use the same subnet user protocol and lead to the same partner.

Example 6

< < < Multiple subscriber numbers (MSN)

```
XSYSP
XSNID     ADRTYP = ISDN,
          SUBNID = ISDN-1

XLTNG     LPUFADR = 00,
          UEWEG = ISDN-S0/TYP03,
          RUFVERZ = LISTE1,
          UEKONF = BUS

XRUF      NAME = LISTE1,
          MSN1 = 12345,
          MSN2 = 67890,
          MSN3 = 40492
XEND
```

The S_0 connection is defined as a switched connection. The transfer route is defined as ISDN-S0/TYP03, i.e. the DSS1 signaling protocol for Euro-ISDN is used in the D-channel.

The connection has the subscriber number list named LISTE1. The access is reachable under each of the MSNs entered in the XRUF macro.

Example 7

< < < MSNs and SNUs

```
XSYSP
XSNID     SUBNID = ISDN-1,
          ADRTYP = ISDN
```

```
XLTNG     LPUFADR = 00,
          UEWEG = ISDN-S0/TYP03,
          UEKONF = BUS,
          RUFVERZ = LISTE

XRUF      NAME = LISTE,
          MSN1 = 1234,
          SNU1 = TP02,
          MSN2 = 9756,
          SNU2 = NEA,
          MSN3 = 5673,
          SNU3 = IP
XEND
```

A Euro-ISDN switched connection is defined in this example (UEWEG = ISDN-S0/TYP03).

A subscriber number list named LISTE is defined with the RUFVERZ operand in the XLTNG macro. Three MSNs are assigned to LISTE in the XRUF macro, making the Euro-ISDN switched connection reachable over three different MSNs.

Different subnet user protocols (SNU) are assigned to the MSNs. A call on MSN1 results by default in the ISO8073 cl2/0 protocol being used for the connection. A call on MSN2 results by default in NEATE/NEAN being used for the connection. A call on MSN3 results by default in TCP/IP being used for the connection.

Example 8

< < < Switched connection using Euro-ISDN

< < < Multi-stage access

```
XSYSP
XSNID     ADRTYP = ISDN,
          SUBNID = ISDN-1
```

```
XLTNG     LPUFADR = 00,
          UEWEG = ISDN-S2,
          UEKONF = BUS,
          RUFNUM = 12345

XZSTW     SKANALN = 1-10,
          NAME = DESCI,
          DTEADR = 1714,
          NETZTYP = X25/TYP9
XEND
```

This example shows a Euro-ISDN S_{2M} connection that is defined as a switched connection (UEWEG = ISDN-S2).

Your own ISDN subscriber number 12345 is defined in the XLTNG macro. Your own X.25 subscriber number (DTE address) is defined with the XZSTW macro (DTEADR = 1714).

In the XZSTW macro with the operand NAME the X.25 connection description is given the name DESCI. A reference must be made to the *x25-description* parameter in the FSS.

Number ranges 1-10 of the X.25 logical channels are reserved for incoming and outgoing SVCs. The network type is defined such that dynamic negotiation takes place to define which computer is the end system (DTE) and which is the network computer (DCE).

Example 9

< < < Permanent connection
< < < Subnetwork interface
< < < Different SNUs / SNPs

```
XSYSP
XSNID     SUBNID = ISDN-1,
          ADRTYP = ISDN-NC
```

```
XLTNG     LPUFADR = 00,              ; D-channel
          UEWEG = ISDN-FV,
          UEPROZ = HDLC/BAC,
          SNU = TP02,
          SNP = T.70,
          UEKONF = PZP

XSNID     SUBNID = X25-1,
          ADRTYP = ISDN-ADR

XLTNG     LPUFADR = 01,              ;"first" B-channel
          UEWEG = ISDN-FV,
          UEPROZ = HDLC/LAPB,
          SNU = IP,
          DTEADR = 123456,
          PKANALN = 1-1,
          SKANALN = 2-10,
          UEKONF = PZP

XSNID     SUBNID = ISDN-2,
          ADRTYP = ISDN-NC

XLTNG     LPUFADR = 02,              ;"second" B-channel
          UEWEG = ISDN-
          FVX25/TYP58,
          UEPROZ = HDLC/BAC,
          SNU = NEA,
          SNP = HDLC,
          UEKONF = PZP
XEND
```

The example shows the definition of a permanent connection that uses a D-channel and two B-channels for data transfer. This permanent connection is designated “Digital S02”.

The channels have three different subnetwork IDs, allowing different protocols to be used on each of the channels. The two computers, which are connected by a permanent connection in the case shown, can be operated using ISO applications on the D-channel, TCP/IP applications with X.25 on the “first” B-channel and NEA applications on the “second” B-channel.

Example 10

< < < X.25 switched connection
< < < X.25 facilities
< < < multi-stage access

```
XSYSP
XSNID     ADRTYP = ISDN,
          SUBNID= ISDN-1

XFACI     FACIL = FAKI,
          AKFACI = REVCH

XLTNG     LPUFADR = 00,
          UEWEG = ISDN-S0/TYP01,
          SNU = TP02,
          UEKONF = BUS,
          RUFNUM = 12345

XZSTW     SKANALN = 1-10,
          NAME = DESC2,
          DTEADR = 1714,
          FACIL = FAKI,
          NETZTYP = X25/TYP9
```

```
XEND
```

This example shows the configuration of an X.25 switched connection using multi-stage access (XZSTW macro). An S_0 connection is defined as a switched connection using the 1TR6 signaling protocol (UEWEG = ISDN-S0/TYP01).

Your own ISDN subscriber number 12345 is defined in the XLTNG macro.

In the XZSTW macro with the operand NAME the X.25 connection description is given the name DESC2. A reference must be made to the *x25-description* parameter in the FSS.

The FACIL operand is additionally used to refer to the operand of the same name in the XFACI macro where it is defined such that incoming calls containing reverse charging requests are accepted.

TP02 is set as the default SNU and this value is used if no other SNU is requested during X.25-connection setup.

Example 11

< < < ISDN permanent connection using X.25

< < < X.25 facilities

```
XSYSP
XSNID     ADRTYP = X25-ADR,
          SUBNID = X25-1

XFACI     FACIL = FAKI,
          PAKLE = 1024,

XLTNG     LPUFADR = 01,
          UEWEG = ISDN-FVX25/TYP9,
          SNU = TP02,
          UEKONF = PZP,
          SKANALN = 1-10,
          DTEADR = 1714,
```

```
            FACIL = FAKI
XEND
```

This example shows the generation of an ISDN permanent connection with a DTE-DTE link on which the two partners can exchange X.25 protocols according to ISO 8208 (with transport protocol 8073 Cl 0/2). The FACIL operand in the XLTNG macro is additionally used to reference the FAKI operand value in the XFACI macro, where the receive packet length is defined with the PAKLE operand.

Example 12

< < < Connection with X.25 maximum integration (X.31 case B)

< < < Use in D-channel and B-channel

```
XSYSP
XSNID     ADRTYP = ISDN,
          SUBNID = ISDN-1

XFACI     FACIL = DFACI,
          WINDS = 2,
          WINDE = 2

XFAC      FACIL = BFACI,
          WINDS = 7,
          WINDE = 7

XLTNG     LPUFADR = 00,
          RUFVERZ = LISTE1,
          UEKONF = BUS,
          UEWEG = ISDN-S0/TYP03,
          PHF = DB,
          X25TEI = 1
```

```
XZSTW     NAME = DKANAL,
          PHF = D,
          DTEADR = 4711,
          FACIL = DFACI,
          PKANALN = 1-1,
          SKANALN = 2-10
```

```
XZSTW     NAME = BKANAL,
          PHF = B,
          DTEADR = 1122,
          FACIL = BFACI,
          SKANALN = 1-100

XRUF      NAME = LISTE1,
          MSN1 = 4711,
          MSN2 = 1122
XEND
```

This example shows the generation of an S_0 connection configured as a switched connection via which data can be transferred using the X.25 protocol in both the B-channel and D-channel. The FACIL operands in the XZSTW macros are used to reference an operand of the same name in the XFACI macros where the number of unacknowledged data packets is defined.

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