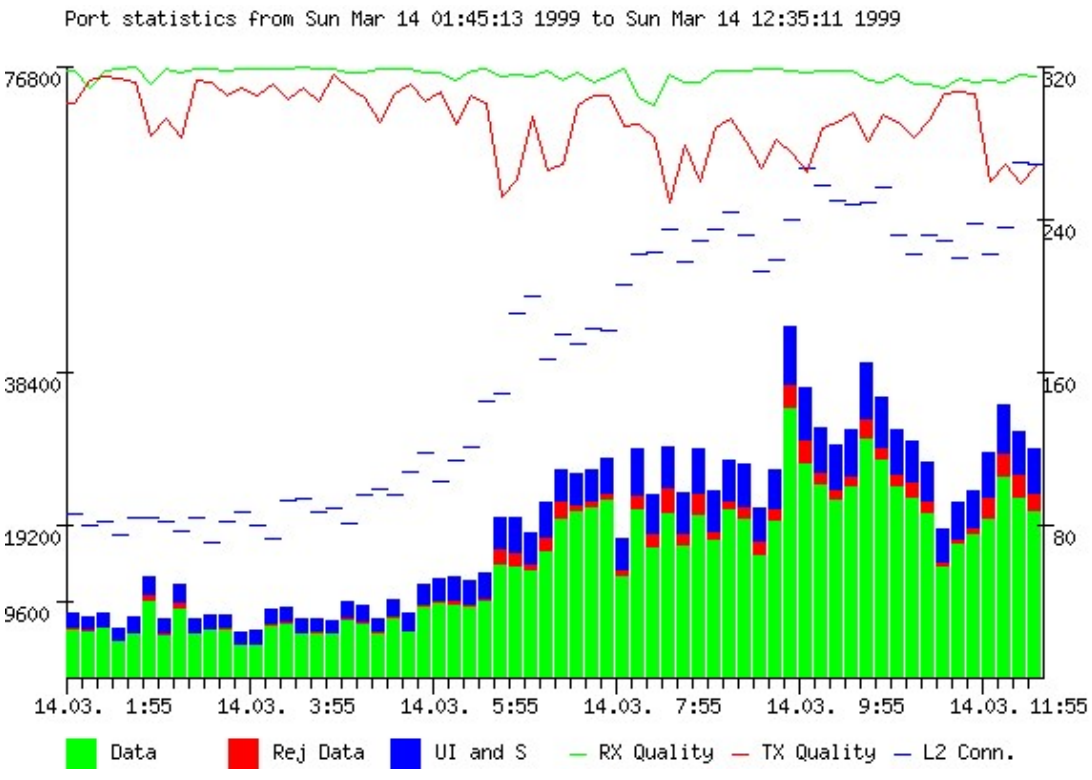
Packet Radio

(X)NET

... connecting the future ...

Handbook to the node-software



Authors

Software: Jimy, DL1GJI,
Documentation: Manfred DL2GWA
Translation: Brian, N1URO and Volker, DL3LK

1 Foreword of the authors

Three years after the first installation of (X)NET version 0.06 on DB0SIG now (X)NET version 1.20 is finished. The possibilities of this software are widened continuously. In many points, it outbids everything until now. Especially the multi-protocol-ability and the compatibility to all current AX.25-protocols, this new software lifts up of the many islands - and special-solutions radio for packed radio. Many hours work for problem analyzing and programming. Much time for preparation of the extensive documentation. Much energy in discussion with enervated Sysops. Many Mails. Many tests. Many telephone calls. Many hours of only observing the software are invested in (X)NET. But it has been worthwhile!
For their effort and their commitment, we would like to thank all involved radio-amateurs heartily.

(X)NET-Software

Jimy, DL1GJI

(X)NET-Documentation

Manfred, DL2GWA

Manx thanks to all (X)NET-Sysops for the many positive mails and the good cooperation. Many mails were not answered - however all are read and - generally possibly - considers. 1.1 General hints to text-construction

1.1 General hints to text-construction

Node-commands are marked in this description as follows:
Command
The commands are entered as entire string, or only with the abbreviations quoted in capital letters.

Examples of input-commands are represented as follows.

```
Command < parameters >
```

Screen-outputs of the node look as follows:

```
Node Table:
SZ :DB0ABZ LG70 :DB0AGM LGBOX :DB0AGM-5 LGTCP :DB0AGM-10
```

Explanations to individual screen-outputs:

```
Explanation:
    \
    XX
```

2 Table of contents

3 (X)NET installation

3.1 Call for terminal and node

TNC-Command < ESC > I enter only the Terminal-Call. The node-call is set with command „MY CALL“ only by command-line (as Sysop). At the first start of the node, the node must „connect " with the default Call NOCALL. It looks as follows to enter the command-consequence about the node-call:

```
* i dl1gji  ...........        #enter the Terminal-Call
* s1  .................        #channel 1
* CHANNEL NOT CONNECTED *
* c nocall  ...........        #connect the node
* (1) CONNECTED TO 0:NOCALL *
= >sys  ..............        #becomes Sysop
= >my call dl1gji-11  .        #enter correct Call
* d  ..................        #again out
```

3.1.1 Terminal-Connect from outside

Normally the terminal cannot connect from a user outside. In order to enable this, you have to notice following:

- Terminal-Call and Node-Call must be different
- A local-entry is necessary for the Terminal-Call.

The local-entry for the above example looks so:

```
= >router local add 0 dl1gji nd Jimy
```

The stated Port 0 is declared only for syntactic reasons, it is ignored.

3.1.2 Restrictions

Any Call can be set to each terminal-channel. Incoming connects take place only on the channels that are identical with the Terminal-Call. The Terminal-Call is identical with the Call which is set on channel 0 (Monitor-channel). Several different Terminal-Calls cannot be entered!

3.1.3 Hardware-configuration and background-processes

Two files are available in order to execute commands with automatically start of the software:

- AUTOBOOT.NET
- AUTOEXEC.NET

The commands in the file AUTOBOOT.NET are executed as first. This file is used for hardware configuration. I.e. it normally contains a row of ATTACH-Commands. Through the statement of one command-line-parameter when starting (X)NET you can declared also an alternative AUTOBOOT - file.
The file AUTOEXEC.NET is used to start background-processes or to set parameters.

4 (X)NET commands

4.1 Commands for "User"

Part 1 of this description contains information about user-commands of the node. These commands are available of course also to the Sysop.

4.1.1 BBS

With the command "bbs" the user gets into the TNC3BOX. The commands are very similar those of the MailBox. Further see under HELP.
A short comment: For recognizing to the user, whether he is now on node-level or in the box, the Digi passes out different prompts. In the node-level only

```
=>
```

if the Sysop did not written down a different prompt. Inside the box the prompt looks like (for example):

```
(DL1XYZ) DL2GWA DE DB0SIG >
```

4.1.2 Connect < call >

With the Connect command, a connection is set into another node, or user. The input,

```
CONNECT DB0XYZ or also C DB0XYZ
```

causes the list of known destinations to be scanned first about the Call DB0XYZ.

1. If the destination is found in the FlexNet or TheNetNode list, a connect takes place through the best way.
2. If the destination is not found in the FlexNet - or TNN-Table, the destination will searched in the Local list and, if found, the Connect is established.
3. If the sought destination is not found also there, the MH-List is searched.
4. If no entry is also found there, the possibility only remains to Connect on the Default-Port of the node. The Sysop (Important sets the Default-Port at duobaud-user-ports with, for example, 1200Bd- and 9600Bd).

A connection can also done via a specific port. If, for example, on duo-baud-QRGs known on which port the destination can be reached. The input takes place in this particular case:

```
C 1:DB0XYZ
```

In this case DB0XYZ will be connected on Port No. 1, leaving out router or MH list.
Possible error messages are:

```
Failure with...: the sought partner has not reported
Busy from...   : the partner has refused a connection.
```

A Connect command can anytime stopped with a < RETURN >. If another command is sent during a connect, the connect will stop. The second command will not executed; it must be sent again.

4.1.3 Dama

Dama displays all User of the node that takes part momentarily in the DAMA. As well, the priority of the Users is shown, presupposed it DAMA-Mode is active on the node.

4.1.4 Desti

The Destinations-Table generates a list of all FlexNet-Nodes that are reachable through this Node.

```
DB0FNB 0-15 65 DB0FPS 0-15 217 DB0FRBS 0-6 64 DB0FRBS 8-8 77
DB0LEL 0-15 5 DB0LHRS 0-15 64 DB0LJS 0-15 195 DB0LOES 0-5 45
DB0QS  3-3 85 DB0QTS 0-15 22 DB0RAVS 0-7 7 DB0RBAS 0-7 8
  /                  /                /
Call -              SSID           average of
signs                             runtime (at 100ms)
```

Announcement of a route with the argument CALL, for example D DB0CZ):

```
* * * DB0CZ (0-15) T=40
=>
* * * route: DB0SIG DB0BAX HB9W HB9AK-1 DB0SBK DB0CZ
=>
```

The Call of the Target appears, with SSID-range and average of runtime. Additionally, the route of the exit-node appears up to the destination-node. The retrieval of the destination-table can be passed out also optional by part of the call. For example: Search to all FlexNet-Nodes begins with characters DB0B.... Input:

```
D DB0B

DB0BAC 0-15  94 DB0BADS 0-7 1579 DB0BAXS 0-9 3    DB0BBGS 0-10 4
DB0BCC 0-15 236 DB0BIBS 0-7 8    DB0BIDS 0-15 208 DB0BLNS 0-15 980
DB0BM  0-8  461 DB0BMIS 0-15 319 DB0BOHS 0-12 855 DB0BOSS 0-15 273
DB0BOX 0-12 326 DB0BQS  0-0 792
```

Destination command with D DB0CZ * (alternative route) the list generates:

```
*** DB0CZ (0-15) T=41
    DB0BAX      41
    HB9AK-1    -48
```

4.1.5 Help

Here, the User gets a listing of the node-commands

```
command  : description

Bbs      : Mailbox
C!       : Connect without reconnect
Connect  : Connect
DAMA     : DAMA users and priorities
Dest     : Destinations
Help     : help
Links    : show links to NetROM partners
MSg      : message to other users
NEws     : news
Nodes    : lists Nodes
NRR      : send NetROM Record Route Packet
Port     : port parameters
PS       : processes
Quit     : quit box
SAps     : SAPs
Stati    : statistics
SYsop    : sysop
User     : shows users
Version  : software version

External :

FLASHCPY MH       INFO
For more details type 'help <command>'.
```

External commands (External) are XTP-Files, that can be started. By the node-operator, the command-programs are loaded into the Digi and are available to the users after it.

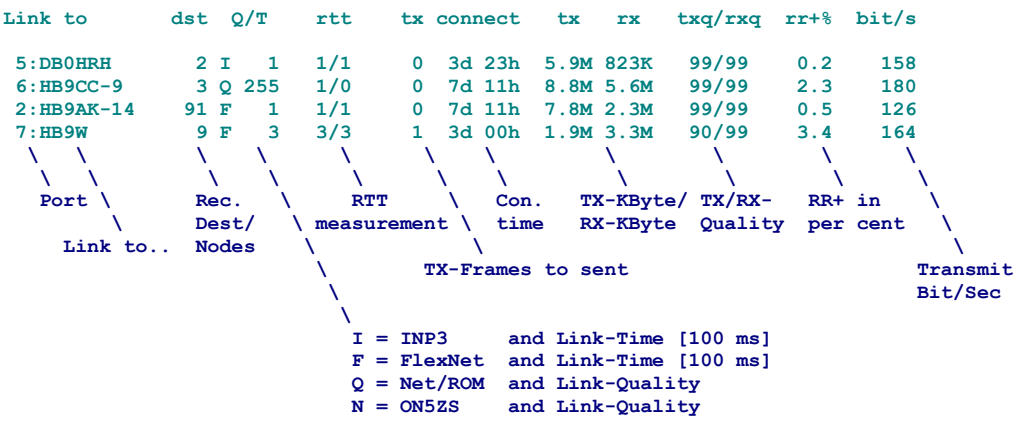
These are autonomous programs, which become “landed” to the node-software (Kernel) and through this started and steered (Layer 7). Since the Sysop chooses which external commands should exist in the node, a help-retrieval is very useful in order to recognize which additional programs are available. If the Sysop has deposited a continuing help over index then as well, the user can have a continuing explanation spent to the individual commands.
Another representation of the help is possibly if the Sysop produces an extra Help-File HELP.TXT which deviates from the default help represented above. The announcement of HELP.TXT has priority to (X)NET-default help.

4.1.6 Info

Announcement of an info-text. An information is passed out only then, if the Sysop has stored an INFO.INF - file in the node.

4.1.7 Links

Show the left with the corresponding Ports. On the L-Command, (X)NET shows the list of attainable neighbor-nodes:



The RX/TX-Quality is calculated with following formula:

RxQ = number correctly rec. Frames /, number correctly rec. Frames + repeated received Frames,
TxQ = number of sent I-Frames /, number of sent RR+ - Polls,

Calculation Bit/s =(TXBytes + RXBytes)/ Connecttime * 8

With the input of an additional plus sign “L +” gets even further detail-information to the respective Link.

4.1.8 LOcals

If Local-Nodes registered in the system, these are listed by command LOCAL.

4.1.9 Mheard

Shows a list of heard calls with date, time and RX-Byte. Heard Calls are only shown directly heard by the node.

```
p:call      - date     time         bytes
1:DL2GWA       4.11.95 12:55:26     22134
4:DB0BAX       4.11.95 12:55:23   1398221
1:DL1GJI-1     4.11.95 12:54:53    159193
```

By input of MH < number > the Heard list will show < number > of list-entries (maximum 100).

For example: MH 20 shows a list of 20 entries. It also can search after a Call or list the Heard-List of a port.

```
MH  DL2GWA
 p:call      - date     time         bytes
 1:DL2GWA       4.11.95 12:55:54     22317
 1:DL2GWA-3     3.11.95 23:09:13      4117

MH  1
 p:call      - date     time         bytes
 1:DL2GWA-2    12.10.96 17:28:21      2806
 1:DL1GJI-11   12.10.96 17:28:09    517185
 1:DB0SIG-1    12.10.96 17:27:54    117804
```

4.1.10 MSG < CALL >

Short messages can be conveyed to a User (Call) that is currently on the system. The recipient of the message can be on the node or mailbox. If the user is inactive the message is immediately sent, otherwise the announcement takes place when the user comes back to the node after a reconnect or pauses activity.

4.1.11 Nodes

All available commands:

N - command	Description
n	Shows all reachable nodes
n *	Shows all known nodes with Quality and obsolescence-counter
n +	Shows all known nodes with term
n dl1	Filters all nodes that begins with " dl1 "
n dl1 *	Filters the " dl1 " nodes and show them with Quality and obsolescence-counter
n dl1 +	Filters the " dl1 " nodes and show them with term
n < node >	Shows the existing route to the stated node
n < node > *	Shows the existing route to the stated node
n < [Link neighbour]	Shows all available nodes received from link. Neighbour. Additional the list will show the received and the sent terms and Qualities.

N without parameters causes the announcement of the NODES-List:

```
N
    LG:DB0AGI       LG70:DB0AGM      LGBOX:DB0AGM-5    LGTCP:DB0AGM-10
 PBFLX:DB0AX          PB:DB0AX-1    SH9600:DB0AZ      BIDFLX:DB0BID
 PBLOC:DB0BQ       PBBOX:DB0BQ-3    PBCLU:DB0BQ-6       BRO:DB0BRO
BRO/RM:DB0BRO-1     BRV:DB0BRV        CE:DB0CEL       CEBOX:DB0CEL-7
   \       \
  Alias   Call
```

A widened representation becomes with N *. It displayed additionally the obsolescence-counter and the connection-quality to the individual nodes.

```
N  *
    SZ:DB0ABZ     0/0       LG:DB0AGI     12/92    LG70:DB0AGM    12/72
 LGBOX:DB0AGM-5  12/81   LGTCP:DB0AGM-10 12/81   PBFLX:DB0AX     12/107
    PB:DB0AX-1   12/89  SH9600:DB0AZ     12/227 BIDFLX:DB0BID    12/76
 PBLOC:DB0BQ     12/98   PBBOX:DB0BQ-3   12/98   PBCLU:DB0BQ-6   12/50
   BRO:DB0BRO    12/134 BRO/RM:DB0BRO-1  12/126    BRV:DB0BRV    12/143
                   \                       \
          obsolescence-counter             quality
```

The widened representation with N + shows the node-list with the term:

```
N +
    SZ:DB0ABZ      -.-      LG:DB0AGI     50.17   LG70:DB0AGM     59.15
 LGBOX:DB0AGM-5   54.93  LGTCP:DB0AGM-10  54.99  PBFLX:DB0AX      44.23
PBLOC:DB0BQ      47.53  PBBOX:DB0BQ-3    47.91  PBCLU:DB0BQ-6    69.81
   BRO:DB0BRO     34.27 BRO/RM:DB0BRO-1   37.23    BRV:DB0BRV     sl(12)

 -.-   = Momentarily not reachable, no further broadcast
34.27  = term
sl(12) = Backward Learning, Slime Trail,
```

With " -. - " marked nodes are not reachable at the moment. They are no longer broadcast and removed 6h after from the list. Backward learned nodes (Slime-Trails) are shown with „sl(xx)“ (xx stands for the obsolescence-counter of the route).

Nodes are also shown with the argument " alias " (For example N KS).

```
N KS

routing DB0EAM v HB9AK max. 14 hops
  DB0EAM    DL1GJI-11   0/6
  DB0EAM    DL1GWX-9    0/6
> DB0EAM    HB9AK     209/6
T = 43.0 s
```

The Nodes-List can also scanned with part of the node call (For example N HB9...) .
All reachable HB9-nodes are shown.

```
N HB9

AG-BOX:HB9AJ-8    SARTG :HB9AK      AK    :HB9AK-1    ak    :HB9AK-7
AMTOR :HB9AK-9    TITLIS:HB9AK-14   SH    :HB9AU      SH-BOX:HB9AU-8
Stberg:HB9EAS     EASBox:HB9EAS-8   EASBox:HB9EAS-9   TI    :HB9EI
BERN  :HB9F       GL    :HB9GL      GL-Box:HB9GL-8    GLD   :HB9GL-13
```

With N < CALL > appears the route additionally:

```
N HB9AE-1

routing HB9AE-1 v HB9AK max. 12 hops

> HB9AE-1   HB9AK     220/6
  HB9AE-1   HB9AK-14  215/6

=>
*** route: DB0SIG HB9AK HB9ZRH HB9AE-1* HB9ZRH HB9AK DB0SIG
```

N < [Link neighbor] shows all nodes, that are reached over this Link,:

```
N < DB0BAX

    SZ:DB0ABZ     61.08     LG:DB0AGI     42.51   LG70:DB0AGM     27.48
 LGBOX:DB0AGM-5   42.26  LGTCP:DB0AGM-10  42.51  PBFLX:DB0AX      10.08
    PB:DB0AX-1     9.72 SH9600:DB0AZ      29.05    BAL:DB0BAL     88.54
   TUT:DB0BAX      0.18    Bhv:DB0BHV     57.21 BIDFLX:DB0BID      9.87
BIDTNN:DB0BID-7    9.51 JULICH:DB0BM      35.46  PBLOC:DB0BQ      10.55
```

N < node > * shows detailed information to the call < node >:

```
n sartg *

routing SARTG:HB9AK v DL1GJI-11

  LOCAL      Inp 3     rx:  -.-  (unreach) tx:  -.-
> DL1GJI-11  Inp 3     rx: 37.13 ( 3 hops) tx:  -.-
  DL1GJI-10  Inp 3     rx:  -.-  (unreach) tx: 37.29
```

```
  Broadcasted 18s ago with quality 126

=>
*** route: DL1GJI-4 DL1GJI-11 DB0SIG DB0BAX HB9AK* DB0BAX DB0SIG DL1GJI-11 DL1GJI-4
```

Displaying this is important for debugging, because here it becomes understandable who has informed whom of something. Here: The destination-node HB9AK is routed via DL1GJI-11. DL1GJI-11 has reported a term of 37.13 seconds (rx) for HB9AK. 3 hops between DL1GJI-11 and HB9AK.
HB9AK was also reported via DL1GJI-10 with a term of 37.29 seconds (tx.). “Broadcast” shows when HB9AK was finally sent Net/ROM Broadcast with which quality per.

4.1.12 NRR < DIGICALL >

NRR (NetROM Record route) determines the way to a destination. There was no possibility to find out which route a package takes through the network consisted of the original specification of NetROM. Loops and package-losses remained in the hidden. The NRR-Packet is routed through the network up to the destination-node and again from there sent back to the sender. All nodes will be recorded.
How this works is described in the appendix.

```
NRR DB0HHO

DL3LK-2 de DB0SYL (07:18:20 UTC) = >
*** route: DB0SYL DB0LEK ? ? ? DB0SEG DB0HHO* DB0SEG ? ? ? DB0LEK DB0SYL
                          \ \ \             \
                           \ \ \             \ The star marks the target-node
                           Nodes with not NRR - capable software

NRR DB0SIG


DL3LK-2 de DB0SYL (07:19:27 UTC) =>
*** route: DB0SYL*
```

If the destination-node is unknown, only the start-node is passed out.

4.1.13 NULL

This command serves performance Test´s. After input from

```
NULL
```

everything sending to the node is thrown directly into the “trash can”. Sending data in this way to the node is good for testing the own transmitting performance.

This mode can be finished only with Disconnect.

4.1.14 POrt

Doing the command „PO“, a list of the logical Ports and the interfaces are shown.

```
po name            interface       baud txd per w dup dam duo con   bit/s

 0 USER 438.025MHz 0 SCC1 HSKISS   1200 200  32 3   0   0   1   0       0
 1 USER 438.025MHz 1 SCC1 HSKISS   9600 180 255 7   0   0   1   3    1158
 2 DB0BAX Link     2 SCC1 HSKISS   9600  50  64 2 255   0   0   5    1876
 3 - - - - - - - - 3 SCC1 HSKISS  19200 220  64 5   0   0   0   0       0
 4 - - - - - - - - 4 SCC1 HSKISS   9600 220  64 5   0   0   0   0       0
 5 - - - - - - - - 5 SCC1 HSKISS   9600 220  64 5   0   0   0   0       0
```

4.1.15 PS

With PS (Process Status), the exact active processes are shown in the node. You can determine if (for example) a background-process (for example Statistic Daemon) is running.

```
0044E020 0 Ghostbuster
0044BB00 0 Chron
00458DA0 1 TERM
008B05C0 0 MSG
00458D20 0 GC
0044F3D0 0 TIMER
00458D60 1 HDLC
00458520 0 SyStat
0044E570 0 FGC
0044EDC8 0 FlexRTT
0044F130 0 FlexLink
004570B0 0 INP
00454BB0 0 Link
00458C20 0 Trash
004560B0 0 RxNRBC
00456078 0 TxNRBC
00457078 0 broadcast
004553D8 0 cleanup nodes
00456A50 0 obsolescent
004504C0 0 L4
     \
      \
    Process-
 identification
  (hexadezimal)
```

Process CRONd starts time-depend processes. TERM/SLIP is for the serial I/O port (RS232), HDLC processes the data incoming by the modem. DL2GWA is an User who is connected to the node and processed his commands.

4.1.16 Quit

The node is left with Quit. The connection is separated from the node (Disconnect).

4.1.17 SAP

Overview about the status of service-access-points (SAPs) of the different layers (OSI-Terminology). With the SAP-Command, the node-operator receives an exact overview, momentarily what in the different levels of the Node is “running ". For example in the transport-layer with command SAP 4. With input

```
SAP
```

following display is shown:

```
Subcommands are:

Name       Description

1          Hardware Layer Info
2          Link Layer Info
4          Transport Layer Info

SA 1

SCC1    : HighSpeedBus Driver Nov 28 1997
        DLC resets: 0 [00] (28.11.97 23:37:11) Waits: 0
        302 RISC statistics:
        DISFC:     0 ABTSC:    17 CRCEC:     0
        RETRC:     0 NMARC:     0 SPIER:     0

SCC2    : SLIP Driver Nov 28 1997 RS232: 38400 Baud
SCC3    : Terminal Nov 28 1997

SA 2
```

```
  3  0:DL2GWA-5   DIS DB0SIG v DB0SIG
 69  3:DB0SIG     <-> VK2DLU v VK2PK-5
 71  3:DB0SIG     <-> VK3JBH v VK2PK-5
 72  3:DB0SIG     <-> OE5CMN v OE5XUR-2


SA 4

  1  3:DB0SIG-5   <-> DB0BAX v DB0BAX
 39  3:DB0SIG     <-> DL2XX v VK2PK-5
 40  3:DB0SIG     <-> DL8UEX-1 v DB0EAM
```

More information about SAPs can listed with “SA 2 +” or “SA 4 +”.

4.1.18 Stat

The statistics-command generates following list:

```
System statistics ( 5d 06h)

Value               |      now|      min|      max|
nodes               |      132|       67|      194|
destinations        |      655|      454|      686|
connections         |       11|        1|       18|
free buffers        |      380|      321|      391|
```

The column “now " shows the value measured at that moment. Column “min" displays the values reached the minimum. Accordingly in the column “Max " the maximum (since the last Reset) of the reached values. “Uptime” gives information how long the node has been running since last reset.

```
System statistics (5d 6h)
```

The announcement shows days/hours.

Explanation to the individual values:

Value	Description
Nodes	Number of known NetROM-Nodes
Destinations	Number of known FlexNet-Destinations
Connections	Connections L2 and L4
Buffer	Available storage for AX25-Packets

The statistics is also listed by port with “S PORT.” This representation can used (for example) with Excel to calculate quality of port.

```
|-----------------TX---------------|----------------RX---------------|
Po       total     sent OK    repeated       total     recv OK   discarded
 0     7456385     6887505      144798     2625177      212058      34859
 1   227706761    78604936    16042525   178990955    29635759    3863758
 2   152431515    75398338    14169372   224149922   149527431    5884176
 3   323741736   122548814    65089166   424520841   216297360   37534880
```

4.1.19 User

The input of U (for USER) shows following list:

```
p port name       fm        via       lst srv lst  p to
 2:Witthoh         VK3JBH    VK2PK-5    <-> con <->  2:DB0ANP
 1:USER9k6         DL2GWA-3              <-> cvs 999
 1:USER9k6         DL2GWA                <-> con
 1:USER9k6         DL2GWA-1              <-> box
 2:Witthoh         DJ7KA-1   DB0AAA      <-> con
  \      \           \         \           \           \
 Port     \          User    connected    Status      connectet
        Portname  with SSID     via                      to
```

The User-List shows the incoming users of the node and over which Port they connected are.
The momentary Connect-Status of the user appears in the column SRV:

CON	Connected with the node
BOX	User is in the internal TNC3BOX of the node
CVS < channel >	User is in the Convers on channel < channel >
LOG	User has activated the on-line-log
MON	User is in the monitor-command
GIP < IP >	User has received IP-Number < IP > sent from the IP-Router*

*This command is similar to a manual DHCP client request.

The linkstatus column (lst) shows in the detail:

Ad	Linkstatus
SET	Linksetup
FMR	Frame reject
DRQ	Disconnect request
<->	Information transfer
REJ	REJ Send
WAK	Waiting Ackknowledge
DBS	Device Busy
RBS	Remote Busy
BBS	Both Busy
WDB	Waiting Ack And Device Busy
WRB	Waiting Ack And Remote Busy
WBB	Waiting Ack And Both Busy
RDB	REJ Send and Device Busy
RRB	REJ Send and Remote Busy
RBB	REJ Send and Both Busy
<?>	Hop to hop

4.1.19.1 U +

With U + the User-Command shows more information:

```
p fm            to          rx tx tr  connect   tx    rx   txq/rxq  rr+%  bit/s
L 2:DB0SIG    <-> DB0BAX     0  0  0   3d 16h  468K 5.9M   99/99    1.1    160
L 1:DB0SIG    <-> DB0SIG-1   0  0  0   3d 16h  604K 158K   70/99    2.1     19
L 2:DB0SIG    <-> OE7MXI     0  0  0  53m 12s   33K 1.6K   97/100   1.4     87
L 2:DB0SIG    <-> DJ8NP-15   0  0  0  48m 00s  4.3K  98   100/100   0.0     12
L 1:DB0SIG    <-> DL2GWA-5   0  1  0  27m 53s   19K 299    62/99    4.9     95
L 2:DB0SIG    <-> OE7MXJ-1   0  0  0  21m 53s   14K  60   100/100   1.4     88
L 2:DB0SIG    <-> DJ1ND      0  0  0  13m 46s  5.0K  68   100/97    0.0     49
L 2:DB0SIG    <-> DK1FX-7    0  0  0   2m 46s   642  15   100/100   0.0     31
```

U can also be port specific: U < port >. For example U 10 for port 10:

```
p   fm            to        rx tx tr  connect   tx    rx   txq/rxq  rr+%  bit/s
L10:HB9PD-8   <-> DB0CZ-1    0  0  0  31m 14s  184   24K   72/100  14.9    105
L10:HB9AK     <-> DB0HP      0  0  0  17h 55m  253K 1.2M   91/100   4.5    191
L10:HB9AK     <-> DB0SIG     0  0  0  17h 55m  240K 238K   83/99   10.4     59
L10:F6KDL-9   <-> F6KFG-8    0  0  0   1h 05m   33K 2.5K   62/98   21.2     73
L10:HB9AK     <-> DB0KH      0  0  0   1h 05m  5.8K 6.0K   86/100  34.2     24
L10:HB9OS-8   <-> DB0KCP-8   0  0  0  30m 56s  2.1K  25K   83/100   4.1    120
L10:HB9AK     <-> DB0SIG-5   0  0  0  17h 54m  408K  10K   95/91    5.9     52
```

The indicated values are described with the Link-command.

4.1.20 VER

The command VERSION gives information of the current software-version from (X)NET with information about the number of maximum possible layer-connections.

```
(X)NET 1.20 for TNC3

 150 L7 SAPs for User Services
   4 L7 SAPs for Sysop-Terminal
 200 L4 SAPs for NetROM
 400 L3 NetROM Nodes
 800 L3 FlexNet Destinations
  20 L2 SAPs for AX.25 Links
 300 L2 SAPs for User AX.25
  20 L1 Ports for AX.25

TF-Version 1.83 TNC3BOX 1.34
Compiled:jan 06 2000 16:42:26 (c) Jimy, DL1GJI
```

4.2 Mailbox commands

Following description refers to the service of the Mailbox.

4.2.1 Check

This command is useful to look it in the box for new msgs since the last check. Also a check can be done with a keyword. With statement of a star ' * ' is principle scanned the entire box. For example:

```
C TNC3
```

The Check command principle refers only to publicly boards. Usermails are not shown.

4.2.2 CON

Out from the box can, like on the node-level, a Connect is built. On this occasion, the CON-Command is to be entered (However, C alone doesn't work, because on this occasion it is only doing a check).

Example:

```
CON DL1XYZ
```

4.2.3 Dir

DIR is used to show the categories of the mailbox. Input of

```
D B
```

listed the table of contents of “public boards"

```
D U
```

listed the table of contents of “user boards“

4.2.4 Erase

ERASE deletes mails from the box. A user can only delete Mails, that comes from him or is directed to him, from the board (publicly or personal category). For example:

```
E ALL 5
```

Erases file 5 in the public category ALL. (Provided, as described, that File is sent by that user.)

4.2.5 Help

The same, like on the node-level, is valid here.

4.2.6 List

List is used in order to display the contents of a category:

```
L ALL
```

L ALL 5-9 is also allowable. Here is shown the news No. 5 to 9 in the category “ALL”.

4.2.7 Mheard

The same, like on the node-level, is valid here.

4.2.8 MSG

MSG is used in order to send a short message to a user of the node. See msg in the node commands.

Example:

```
MSG DL1XYZ Hello, I am here
```

send the text “Hello, I am here” to DL1XYZ.

4.2.9 NAME

The user-name is entered with the command NAME. This name is used on Login, with User-Command and when sending news (MSG). Input:

```
NAME Manfred
```

4.2.10 NEWS

News shows current information, that the Sysop would like to give the Users. It’s similar to (A)ctuell-text with FlexNet or TheNetNode. News can only be called if a text was stored in the system by the Sysop. If no message is stored the news-is 0 kBs big, no news info appears. If something is stored through the Sysop in the news file, the announcement appears:
(For example

```
NEWS NEWS NEWS NEWS NEWS NEWS NEWS

There are important news. Please
read the category XYZ in the box!

NEWS NEWS NEWS NEWS NEWS NEWS NEWS
```

If the internal TNC3BOX is connected first time, the news-info is passed out to the User automatically. With a renewed Connect, the announcement is suppressed. Provided the news-file was not updated meanwhile by the Sysop.

4.2.11 Quit

With Quit, the user leaves the mailbox and is returned to the node. Before leaving, a disconnect info is sent (if existing).

4.2.12 Read

Read is the opposite to send. With read mails are read from the Mailbox.
Following inputs are possible:

Command-format	Description
R	Selections of all entries of the selected category
R 3	Selections of the entry nr. 3 the selected category
R 3-6	Reading No 3-6 of the selected category
R DL1XYZ	Selections of all entries for DL1XYZ
R DL1XYZ 1-3	Reading No 1-3 for DL1XYZ
R ALL	Selections of all entries in the category ALL
R ALL 1-3	Selections the MSG No. 1-3 in the category ALL

4.2.13 REPL

Reply answers a message from a User that just read. The command acts similarly as the SEND-Command, however here it's not necessary to input send-to-call or subject. The box asks after input of REPL for input of text and to finish with CTRL-Z.

4.2.14 Send

Send, the most important command of the Mailbox. Well, because with send, news can be set aside in the Mailbox. Following input-possibilities exist:

Command-format	Description
S DL1XYZ	Message to DL1XYZ, the subject is autom. ordered
S DL1XYZ Hello	Message to DL1XYZ with the subject Hello
S TNC3	Message is set aside into the category TNC3, the title is ordered automatically
S TNC3 Info	Message is set aside in category TNC3 with the subject Info.

After above input, the box asks for input the text. At the end of the message it will completed with keyboard-combination CTRL+Z (Press and hold button Ctrl + press button Z, after that press RETURN) to store the message. A Mail is also completed with the string sequence:
*** end < RETURN >.

4.2.15 User

The command U shows all users who connected at the time (also those who are on the node-level) and additional information about box-users.,.

```
U DL1XYZ
```

shows info about DL1XYZ. Name, if logged, and last login-time, e.g. quit-time.

```
U *
```

generates a list of all in the past logged users in the system with date and time-statement.
The user list of the box has another announcement-form as the user list on the node-level. The content is almost same. A star (*) after the Call means that this User is in the sysop-mode.

4.3 Sysop commands

The 2. part describes the node-commands important for the Sysop. All eXtended commands are applicable fundamental within the TNC3BOX. Whoever has served a TNC3BOX already once will find the way around here quickly.

4.3.1 ATtach

The Attach-Command connects an input/output port (Device) with a driver.

Example:

```
ATT SCC1 HSKISS 8 4
```

Device SCC1 of the TNC3 will be connected with the driver HSKISS. The physical ports (here 4) of the HSBus are beginning with 8 (Port 8, Port9, Port10 and Port11. For at most 4 Portses should be headed over this bus.
The HSKISS-Treiber fully automatically recognizes the baud rates of the connected TNC3s. A particular Arbiter-Hardware is required for the HighSpeedBus.
The baud rates of the modems are not recognized automatically with a tokenring-configuration and have to be entered manually into the port configuration.

Devices inside the TNC3 are the SCCs
- SCC1
- SCC2
- SCC3

Devices inside the PC are:
- COM1 - COM8
- VANESSA
- IP-Sockets

Drivers are:
- HSKISS
- KISS
- SMACK
- TRKISS
- AX25
- TRSMACK
- SRPM
- AXIP
- AXUDP
- RMNC
- SLIP

4.3.2 DAMA

```
DAMA

Pa Name         Value       Range       Description

 1 dslot         3000 [0       ,    5000] DAMA Connectslot [ms]. 0: off
 2 minpoll         10 [0       ,      30] [s] minimal poll time for inactive users
 3 txdpri           2 [1       ,       8] 1 slow, 2 norm, .. , 8 max
```

DAMA configuration with three parameters:

4.3.2.1 Connectslot:

Time of Connectslots in ms. Whoever doesn‘t need connectslot can put the parameter on 0. The Connectslot is a wait, in which the node no User poll, to give an User a change for connect.

4.3.2.2 Pollwait:

Pollwait protects the User from too many polls. Pollwait steers like quickly consecutively an inactive User should be polled. Pollwait is a sub-border.

4.3.2.3 Txdpri:

This parameter steers, whether should be optimized on thruput or answer-time. For QSOs and Conn-verse-business, the attitude is optimal 1. For mailbox-full-time-user is suitable the value 8. In the practice, a value is good between 2 and 4.

4.3.3 DETach

The DETACH-Command removes a driver from an device.
Example:

```
DET SCC3
```

Hereby, SCC3 becomes free again.

4.3.4 DIr

The directory-command generates a list of the Node-RAM-Disk. Wildcards * are allowed.
For example DIR *.TXT – is listing all TXT-Files.

4.3.5 DISc

Syntax: DISC < L2/L4 > < SAP-Nr. >

The Disconnect-Command makes it possible for the Sysop, to drop an existing L2 or L4 connection. First, one checks with the SAP-Command, whether it is a L2 - or a L4 - Connect.

```
SA 2

  1  2:DB0SIG <-> DB0BAX
  5  1:DB0SIG <-> DB0SIG-1
 51  1:DB0SIG <-> DL1GJI
 56  1:DB0SIG <-> DL2GWA-3
106  2:DB0SIG <-> HB9AK DB0BAX

SA 4

 37  2:DB0SIG-5 <-> HB9AK v HB9AK
142  2:DB0SIG <-> OE5COX v OE5XUR-2


dis 2 5
  \   \  \
   \   \   Number from the list
    \    Layer 2
      command
```

Consequently, this connection will disconnected.
As well, the L4-connection DB0SIG < - > OE5COX with the SAP-Number 142 with the command

```
dis 4 142
```

will disconnected. With this procedure, undesirable connects are manually disconnected by the Sysop.

4.3.6 EDIT

ASCII-texts can be edited with Edit. This command corresponds to the XEDIT of the TNC3BOX.

4.3.7 EXECute

Execute starts a text file with the extension .NET, with more (X)NET-Commands (Script-File or Batch).

4.3.8 Help

The Sysop gets a widened help about commands. Commands marked in column description with a ! are only in available in Sysop mode.

```
command  : description

ATtach   : !attach driver
Bbs      : Mailbox
C!       : Connect without reconnect
Connect  : Connect
DAMA     : DAMA users and priorities
Dest     : Destinations
DETach   : !detach driver
DIr      : !list directory
DISc     : !disconnect L2 or L4 channel
EDIT     : !edit text file
EXECute  : !execute script file
Help     : help
Links    : show links to NetROM partners
LOAD     : !upload binary file
LOcals   : show local nodes
LOG      : !print Log Messages
MHeard   : Heard-List
MSg      : message to other users
MY       : !set my call and alias
NEws     : news
Nodes    : lists Nodes
NRR      : send NetROM Record Route Packet
NULL     : null device for tests
PASSwd   : !set new password
PAram    : !L4 Parameters
Port     : port parameters
PRGEXIT  : !exits (X)NET
PS       : processes
Quit     : quit box
RBIN     : !read binary file(s)
READ     : !read text file
REName   : !rename or move file
RESET    : !Reboot system
RM       : !remove file
Router   : !router commands
RUN      : !exit and run next application
SAps     : SAPs
START    : !start background processes
Stati    : statistics
SYsop    : sysop
TERM     : !switches terminal on and off
TIME     : !set date and time
User     : shows users
Version  : software version
XCOnn    : !list of users which can use con command

Behind here are commands, which are registered by background prozesses thereself.

ARp      : !arp
ARPlist  : list arp entries
IPRoute  : !IP router commands
IPRlist  : list IP routing entries
IPStop   : !stops IP Router
MYIP     : !set our own IP
GETIP    : get IP-Address
CONVers  : enter convers mode
CVSTOP   : !stop convers mode

External :

BEACOND  CALLCHKD CONVERSD DUMP     FLASHCPY LS       MONITOR  PFTP
POKE     POSTMORT ROUTED   STATD    ep_crc   INFO     BOX      DX
(X)NET

For more details type 'help <command>'.
```

The Sysop-Command list is clearly widened opposite the Help-Command of the User. Commands with a preceding “!” are only for SYSOP disposal. These commands are not shown to User.

4.3.9 LOAD

Load enables an “upload” from binary-files into the RAM-storage of the node. The Load-Command also stores ASCII-text files, that contains text-macros (also see “useful tips”).

4.3.10 LOG

The log-command is a useful relief organization-tool for Sysops. When LOG is started, the node displays among others router info out of L3/L4-layer. Over a longer time period the momentary link situation can be consequently “live” monitored. If necessary the terminal must be stopped with the Term-Command, otherwise the announcements take place at the Console. The log-command can also be used for storing a short commentary into the Log-File. For example:

```
This line is stored in the NETROM.LOG
```

In the Logfile NETROM.LOG, the text < this line.... > with date, time and Call of the text-originator is stored.

To look at process-news, with

```
LOG + DAMA ROUTER
```

or

```
LOG - ROUTER TRASH
```

Info is filtered. In the first example its shown by the ´+´ only Dama and Router; in the second example its shown everything besides Router and Trash since the process-news were excluded Router and Trash by the ´-´.
Log-info is closed with one < RETURN >.

4.3.11 MOnitor

With help of this command one or several Ports are “monitored”. The or these Ports are declared by a ´+´ and the port number. Optional also the statement of a Call.

Syntax:

```
MONITOR {opt} [+<port>[+port]] [<call>]
```

The options [opt] begins followed from one of the following letters with a deficit-sign:

Letter	Meaning
U	unproto transmissions
i	Information
S	Status packets
l	Logging information is shown
K	With time and date
X	suppresses hex announcement
H	The contents of the info-packages are not shown (Headers only)
P < PID >	Selection of the PID

With the option of -p, the Frame-Types can be selected for TCP/IP, NETROM, FlexNet or AX25. As PID (Protocol Identifier) can become stated:

PID	for Frame-Type
06	VJ-compressed TCP/IP
07	VJ-uncompressed TCP/IP
CC	TCP/IP
CF	NETROM
CE	FlexNet
F0	AX25
C8	ARP

Example:

```
monitor -uisl -p CC +1 +3
```

Monitor decodes also the INP3-Routinginfos:

```
monitor -i +<portnr>
```

```
2:fm DL1GJI-11 to DL1GJI-4 via DL1GJI-10* ctl I17^ pid cf
DB0FD-3   3225 (13) Opt: 0
DB0FD-10  3225 (13) Opt: 0
DB0NHM    1609 (6) Opt: 0
```

Term and number stages (hop) are shown at each node. Opt = 0 means that no node-options were transferred.

The Port number is always declared with a leading plus-sign. Empty-sign between '+ ' and the port number is not allowed.

Through the statement of a call, only the AX.25-Frames for and to the call are monitored. The call can declared with Wildcards '* ' and '? '
Example:

```
monitor DL1XYZ
```

decode everything from and to 'DL1XYZ '. A Frame to 'DL1XYZ -2 ' would not be shown here.

```
monitor DL1XYZ *
```

decode everything from and to 'DL1XYZ ' - independently from the respective SSIDs.

```
monitor +1 DC *
```

decode all Frames on Port 1 from and to stations, that begin with 'DC'.

Monitor output is stopped with the input of a < RETURN >.

4.3.12 MY

That "MY"-Command has several sub-arrangements:

4.3.12.1 MY ALIAS

Enters the Net/ROM-Alias. With the entry of ALIAS with MY ALIAS XXXXXX, small - and capital letters are possible. The alias has up to 6 case sensitive characters.

4.3.12.2 MY CALL

Enters the node call. A SSID can optional stated.

4.3.12.3 MY DEFPORT

Enters the default port - normally the user port.

4.3.12.4 MY PROMPT

Enters the Prompts (within the node-level) That TNC3BOX-Prompt remains unchanged however. On this occasion (X)NET place-holders applicable, for example %D for date See further in this document for more variable strings.

4.3.12.5 MY TCALL

Enters the Terminal-Calls

4.3.13 Parameters

The node-parameters are divided in three groups:
1. BOOT - Configuration of boot-parameters (Parameters that only becomes aktiv after a node reset).
2. TNC - Configuration of TNC-Parameters
3. TRANS - Configuration of transportation-layer-parameters, Layer 4,

4.3.13.1 PA boot

Parameters that only becomes active after a node reset.

The parameters are set at first-time starting (X)NET on default value . At bigger nodes with enough memory the parameters can be increased. Is necessary to do a reset of the node after it.

```
PA Boot

Pa Name         Value       Range       Description

 1 buffer         400 [100     ,   4000] max. number of memory buffers
 2 destin         800 [16      ,   4000] max. number of FlexNet destinations
 3 heard          400 [1       ,    400] max. number of heard calls
 4 l2sap          300 [10      ,    750] max. number of L2 connects
 5 l4sap          200 [10      ,    250] max. number of L4 connects
 6 nodes          400 [16      ,   4000] max. number of nodes
 7 term             4 [1       ,     50] max. number of terminal channels
 8 users          150 [10      ,    500] max. number of users

requires abt. 514 Kbytes
```

4.3.13.1.1 BUFFER

According to size of the Node-RAM-Resources, buffer-storage should be available enough. This parameter depends on the ram size of the Digis and should be checked therefore. The value-area goes from 100 to 4000 buffers. Default is 400 buffers.

4.3.13.1.2 DESTIN

Fixes the number of entries into the destination list. The number of destination entries must be set individually for each node. Nodes without any direct FlexNet-Neighbour can set this entry on the default-value 16. If a FlexNet-Neighbour is connected the number of the entries follows if necessary needs. 800 entries are normally needed.

4.3.13.1.2.1 HEARD

Sets the number of entries for directly heard stations into the Myheard-List (MH)

4.3.13.1.3 L2SAP

Sets the number of maximum L2-connects .

4.3.13.1.4 L4SAP

Sets the number of maximum L4-connects

4.3.13.1.5 NODES

Sets the number of Nodes-entries in the Nodes list. With very big networks, it can be advisable to limit the size of the N-List. From minimally 20 until up to 1000 nodes can be set. Default is 200 nodes.

That parameter must be greater than the number of nodes read out of the statistic list. Therefore: Observes statistics and increases value if needed.

4.3.13.1.6 TERM

Sets the number of TNC channels on the node. 4 channels are normally enough. The value can be adjusted to 50 for direct connection of a Mailbox to (X)NET.

4.3.13.1.7 USERS

Sets the number how many users can use the node simultaneously. The value-area is goes from 1 to 250. Default is 30. This value is enough in most cases. At nodes with high traffic, the value can increased if necessary.

4.3.13.2 PA TNC

4.3.13.2.1 BBS

The node-operator adjudicates whether he activates the integrated TNC3BOX (1) or refuses the access to the box (0). The Mailbox is a very practical equipment within a node, but requires a bulk of the available ram area.

4.3.13.2.2 H

Heard-List on (1) or off (0). Should always switched ON!

4.3.13.2.3 IPOLL

Maximum length of the IPOLL-Frames, value 0.... 128).

4.3.13.2.4 R

Digipeating ON (1-3) or OFF (0). With turned off Digipeating "hop to hop"-Connects still possible, however no Broadcasts are "digipeated."

Value	Description
0	Digipeating turned off
1	Intelligent Digipeating switched on
2	Cross-Digipeating activated. With the Digipeating TX-Port and RX-Port is exchanged in each case.
3	Digipeating through the same Port

4.3.13.2.5 U

TNC-Connect-Text ON (1) or OFF (0). Should always turned off since the Connect texts are set aside as files in general, s.o.

4.3.13.3 PA TRANS

The L4-Parameters of the node can be adjusted by the PA trans-command to individual realities.

```
pa trans
```

```
Pa Name        Value       Range       Description

 1 bsydelay   180000 [1000   ,2000000] [ms] Partner busy delay timer
 2 lifetim        30 [10     ,    200] Packet lifetime [hops]
 3 paclen        236 [64     ,    236] Packet length
 4 retry           3 [1      ,      5] Transport retries
 5 tack         3000 [1000   ,2000000] [ms] Frame acknowledge delay timer
 6 tfrack     100000 [1000   ,2000000] [ms] Transport retry timer
 7 timeout   7200000 [1000   ,9000000] [ms] No activity timeout
 8 window         10 [2      ,     15] Window size
```

4.3.13.3.1 BSYDelay

Time, for which is waited, until after a packet-jam of the neighbor (Choke) is send again.

4.3.13.3.2 Lifetime

Layer 3/4 packets have a lifetime-field, in which is declared, how long this package " has to live ". It is declared how often this package can be further-reached through a node. With each far-attainment through a node, the field is based about 1, with achievement of 0, the package is relayed to the next neighbor no longer, probably however still to the own Level 4 if decides for it. With a package generated by the own node, the lifetime-counter is put on this parameter. The counter should prevent that a package is further-reached eternally by loops in the network. This value should not set over 50. Value-area is between 10 and 200. Default is 30.

4.3.13.3.3 PacLen

This value fixes the size of transport packets.

4.3.13.3.4 Retry

After this number of attempts assumes that a node is unreachable anymore. Because the Transport-Layer is put on a Layer2, this counter can only run out if a node is short-term or quite unreachable. The value-area is between 1 and 5. Default is 4.

4.3.13.3.5 TACK

For this time in milli-seconds is waited before confirmation of a transport-layer information-packet, that must be confirmed. The sense is that the confirmation can be put into a new to be transmitted transport-layer info packet if necessary. That spares one transport-layer packet if waiting a little while until there is a new to be transmitted transport-layer . Furthermore, the reception of several Info-Frames can be confirmed by it with one single answer-Frame.

4.3.13.3.6 TFRACK

If no acknowledgment for a sent information packet of the opposite station arrives within the frack-time, is asked whether that has arrived info.

4.3.13.3.7 Timeout

Time, after which the L4 is reduced, if no info are transferred more.

4.3.13.3.8 Window

This parameter sets the at most possible number of Frames, that can be unconfirmed by a Layer 4 connect. The actually used number follows the lowest T-Window-value of both involved nodes.

4.3.14 PASSwd

The Sysop-Password can be altered with PASSWD. The syntax corresponds to the XPW of the TNC3BOX (Description sees there).

```
PASS
```

sends:

```
Security: 1
Passwd  : 40 Characters
```

The Password-String is not passed out. Only one hint appears how many characters the password has. A new string-entry with

```
PASS 1U234A56C78Y90........
```

4.3.15 Port

Configuration of User - and Link ports takes place through the Port command with corresponding Port number, PO 1, PO 2 etc.

```
Pa Name        Value       Range       Description

 1 baud         9600 [300    ,1600000] baud rate
 2 calib           0 [1      ,     60] Calibrate [min]
 3 dama            0 [0      ,      4] DAMA
 4 dbaud           1 [0      ,      1] Duo baud
 5 duplex          0 [0      ,    255] Duplex
 6 name      USER 438.025MHz     [ 15] Port name
 7 persist       255 [10     ,    255] Persistence
 8 quality       128 [0      ,    255] Quality
 9 reset           0 [0      ,      1] Reset port
10 retries        10 [5      ,    255] Retries
11 slot           50 [1      ,  60000] slottime
12 t3         180000 [30000  , 600000] link activity timer
13 txdelay       180 [1      ,  60000] TxDelay
14 window          7 [1      ,      7] L2 Window size
```

Port parameters can be altered through the Port command, for example

```
PO 1 ret 20
```

Here, the Retries on Port 1 are set to the value of 20. The values can be set only within that in the category range of stated value-table. The syntax is for each Port therefore as follows:
PORT < Port Number > < parameter-number > < value >

4.3.15.1 Baud

Here is the modem-baud rate setting of the corresponding Ports. With Tokenring-Digis, the baud rate is to be entered in manually for each connected port since the modem-baud rate is not recognized automatically like the High-Speed-Bus.

4.3.15.2 Calibrate

Transmitter is switched on for the inputted time. To be used for the antenna service and modem adjustments.

4.3.15.3 Dama

For the selected Port = DAMA ON (1-4) or turns OFF (0). (X)NET can administrate up to 4 of each other independent DAMA-MASTERs. That is: one of the four DAMA-Masters can be put in each Port.

Example:

```
po name            interface       baud txd per w dup dam duo con   bit/s

 0 USER 438.025MHz 0 SCC1 HSKISS   1200 200  32 3   0   1   1   0       0
 1 USER 438.025MHz 1 SCC1 HSKISS   9600 180 255 7   0   1   1   3    1158
 2 DB0BAX Link     2 SCC1 HSKISS  19200  50 255 7 255   0   0   5    1876
 3 USER 23cm - - - 3 SCC1 HSKISS   9600 180 255 7   0   2   0   0       0
```

Port 0 and 1 has a direct reference to each other, since both serves a User-Port for different baud rates on same frequency. These two Ports are configured on DAMA-MASTER 1. The User-Port 3 has no reference to ports 1 and 2 and is therefore configured as DAMA-MASTER 2. Two of each other independent DAMA-Processes are running on the node.

4.3.15.4 Duob

Duo-baud is set to ON, if a Doubaud-port (For example User-Port 1200/9600 Baud) exist.

4.3.15.5 Duplex

If this Port is a Simplex-TNC-Port, then set the value to 0. At Duplex-Links, optional set PTT-delay to a time of 2... 255 seconds.

4.3.15.6 Mode

Hardware-specific parameters can be set by mode-command. At this moment, this command is required only for PC-FlexNet-Drivers:

Meaning	hex	decimal
external RX-sync	0x40	64
external TX-sync	0x20	32
NRZ instead of NRZI on SCC	0x10	16
CRC on KISS, DCD on SER12	0x02	2
Channel off	0x01	1

If an external TX-sync (32) and an external RX-sync (64) is used simultaneously, the configuration of the port is (32 + 64 = 96):

port < pn > mode 96

Attention: The fashion-parameter is not stored.

4.3.15.7 Name

To each Port, a name can be assigned - at most 15 letters.

4.3.15.8 Persistence

Probability, with which a packets are sent, after the channel is free. P-Persistence-Value (10-255)

4.3.15.9 Quality

Old NetROM or mailboxes supports no RTT-Measurement. The kindliness of the connection to these nodes must be fixed by the Sysop. To this, the parameter serves Quality.
A Quality of 0 is special:

Quality 0 prevents the automatic construction of NetROM-Links by receiving of Nodes-Broadcasts

Only if the node itself sends a Broadcast through this Port to the Link neighbour, is varied by this rule.

4.3.15.10 Reset

Resets the Port by Reset-Parameter (1).

4.3.15.11 Retries

Number of L2-Retries. If the value exceeds, the connection becomes disconnected. The stated number of retries refers to a connection between node and user.

4.3.15.12 Slot-Time

This parameter declares the duration of the time-screen for the P-Persistence-Steering. Every time if the TNC want to transmit a package and the coincidence-number (described under slot-Time) is outside the P-Persistence-Value, then it is waited for the duration of the time-screen and is started again through the P-Persistence-Procedure.
Recommended: 9k6, 1k2, 19k2 = 100ms

4.3.15.13 T3

The T3-Parameter (Link Activity Timer) determines the time, after which the Layer2 checks, whether a Link still exists if the whole time was no activity previously.

4.3.15.14 TxDelay

TX-forward-run-time after keying TX in front of transmitting the first data-packet.

4.3.15.15 Window

Sets the TX-L2-Window Size, i.e. how many Info-Frames can be sent at most with one transmitting.

4.3.16 PRGEXIT

This command is used to shut down the node-software. Should used only in the DOS-Version.

4.3.17 RBIN

RBIN is used to download one or several binary files. IF the used terminal-program is able for binary storage. The command is:

```
RBIN <Dateiname.Ext>
```

Wildcards [*] are allowed. With command

```
RBIN *.TXT
```

all Text files, that exist on the RAM-disk of the node, are downloaded binary. A complete backup of the node can be produced by it (For example: All mails inside the box, user etc.).

4.3.18 READ

Text-Files can be read with READ. This command corresponds to the XREAD of the TNC3BOX.

4.3.19 REN

A file can be renamed with RENAME.

4.3.20 RESET

Make possible to restart the node. The Sysop has sent this command by mistake to the node (Should occur), he can break it off with a subsequent RETURN. Return must have reached the Digi within 10 seconds so that this command becomes ineffective.
A Sysop-Reset-Event and the retraction within the 10 sec delay are noticed in the Log NETROM.LOG.

4.3.21 RM

Remove allows to delete Files from the RAM-drive of the node. Wildcards * are not allowed.
These are allowable only with the Del-command - > see DEL.

4.3.22 Router

[Intervention-Layer-Parameter, Layer 3,]

Different Routing-Parameters of the node are set with the R-Command. An input of the capital letters suffices:

```
RO < RETURN >
```

generate following list:

```
Subcommands are:

Name        Description
pa          Parameter
bc          NetROM broadcasts
FlexNet     FlexNet link partners
local       local Nodes/Destinations
```

Explanations to the Subcommands, see to this following examples,:

4.3.22.1 RO PA

With ro pa, Router parameters are changed:

```
RO PA

Pa Name         Value       Range       Description

 1 broadca        600 [300     ,   3000] broadcast interval [s]
 2 filter           0 [0       ,      1] filter blank alias
 3 minBcas          4 [1       ,     12] min obs-count for broadcast
 4 minQual         69 [0       ,    255] min quality for broadcast
 5 obsInit          6 [1       ,     12] initial obs-count value
 6 rtt            300 [10      ,    600] RTT measurement interval [s]
```

4.3.22.1.1 Broadcast

Broadcast fixes the time interval when Net/ROM-Broadcasts should be sent out. At same time with transmitting of Broadcasts it will down-count also the obsolescence-counters of all nodes.

4.3.22.1.2 Filters

“Filter”-Parameters filters nodes with empty alias existing from empty-signs.

4.3.22.1.3 MinBcast

Nodes with a Obscelence-Counter which is more inferior than stated, are no longer sent out in Net/ROM-Broadcasts.

4.3.22.1.4 MinQual

Nodes with more inferior quality as MinQual are no longer shown in the node-list. A new node below the min-qual-border is not adopted into the Node list.

4.3.22.1.5 ObsInit

Sets with which obsolescence-counter a node, heard by a Net/ROM-Broadcasts, is adopted into the list.

4.3.22.1.6 RTT

Sets RTT-measurements in which cycles (RTT = Round trip Time) should take place.

4.3.22.2 RO BC

```
RO BC

Subcommands are:

Name        Description

add         add broadcast
delet       delete broadcast
list        list broadcasts
send        send broadcast
```

4.3.22.2.1 Add

In order to send out a Broadcast, that should be send to HB9AK via at Port 2 directly connected partner DB0ABC, the Router-Command is following: (Router) that (Broadcast) through adds on Port (2) to (HB9AK) via (DB0ABC). The input looks therefore as follows:

```
RO BC À 2 HB9AK DB0ABC
         \     \        \
       port destination  via
```

This is useful if (For example) DB0ABC is a FlexNet-Neighbour and HB9AK a NetROM-Node to which the node list is be send to.

A Broadcast to “Nodes” is heard by all Net/ROM-Partners.

4.3.22.2.2 List

A retrieval, which Broadcasts take place through input from lists:

```
RO BC L

Broadcast Table

 2 HB9AKS
 3 NODES
1 Broadcasts
```

4.3.22.2.3 Send

In order to send out a Broadcast immediately, send the command:

```
RO BC S
```

at the node.

4.3.22.3 RO FLEXNET

RO FlexNet is required to add or delete FlexNet-Links.

```
RO Flex

Name        Description
add         add FlexNet-station
del         delete FlexNet
list        list FlexNet
reset       reset FlexNet
```

4.3.22.3.1 Add

Configure a FlexNet-Link.

```
Syntax:

ro flexnet add <port> <call> [<viacall>]
```

Example:

```
ro flexnet add 3 db0bax
```

Configure a FlexNet-Link on Port 3 to DB0BAX.

4.3.22.3.2 Del

Remove a FlexNet-Link.

```
Syntax:

ro flexnet del <port> <call> [<viacall>]
```

4.3.22.3.3 List

Shows all configured FlexNet-Links.

4.3.22.3.4 Reset

Reset sends a FlexNet-Routing-Reset-Frame to the stated link.

```
Syntax:

ro flexnet reset <port> <call> [<viacall>]
```

4.3.22.4 RO LOCAL

RO Local is to defines “Local-Nodes” like Mailboxes or Weather-Stations uses.
“Mail” - and “Unproto Beacons” can also be assigned to a Port with help of Local-Entries.

```
RO Local

Subcommands are:
Name       Description

add        add local
delet      delete local
list       list local
```

4.3.22.4.1 Add

New entries are planned with the ADD-Command:

```
                                          The ! does the entry in
                                          Nodes/Dest. List invisibly.
                                                   /
Router local  add <port> <call> <n|d|nd> [!ALIAS]
                      \     \       \            \
                     Port  Call    n=TNN        optional
                           Target  d=FlexNet    NetROM
                                   nd=both      alias
```

“Via” statements behind the Target-call is also possible:

```
router local add <port> <dest> [viacall] (n|d|nd) [alias]
```

Examples:

For Local Nodes on Port 2:

```
R L À 2 OZ6DIG N AGER
```

For two different beacons (For example) one for Mail and one for Unproto-broadcast coming from a FBB-Mailbox:

```
R L À 0 MAIL N #BAKE1
R L À 0 MAILS N #BAKE2
```

and the relevant Port is set to qual 0!

The Local node list is only for stations that cannot route by themselves. DON'T enter FlexNet-Nodes or NetROM-Nodes please. Such entries would deliver wrong information to the Auto-Router.

4.3.22.4.2 Del

The command-consequence Router Local Del deletes a Local-Entry.

```
router local del < dest > [viacall]
```

The statement of the Ports is not necessary at command "router local Del".

4.3.22.4.3 List

Shows the list of all Local-Entries.

4.3.23 RUN

(X)NET is shutting down and starts the stated program-application.

4.3.24 START

Programs, that run in the background, are activated with the start-command (For example) IP-ROUTER or CONVERS. Description of the external processes on following sides....

```
START CONVERSD
START ROUTED
START BEACOND
```

4.3.25 Statistics

The Sysop-Statistic is more extensively represented, as that for a normal Users.

```
Uptime (  6d 12h)

Value                |      now|      min|      max|
nodes                |      207|       89|      290|
destinations         |        0|        0|        0|
users                |        6|        3|       10|
L7 connects          |       10|        3|       14|
L4 connects          |        7|        0|        9|
L2 connects          |        5|        0|       10|
!free users          |       46|       40|       50|
!free L7 connects    |       83|       78|       90|
!free L4 connects    |       98|       91|      100|
!free L2 connects    |       95|       90|      100|
free buffers         |      966|      724|      983|
!free memory         |   656552|   656552|   856568|
!used memblocks      |      321|      287|      730|
!process switch [hz]|    10890|     2258|    11452|
!timer accuracy      |    60000|    60000|    60505|
```

```
Bit/s (MAC)          |      435|       12|    10982|
```

For Sysops the statistics are sent with widened parameters.

Explanation to the individual values:

Value	Description
Nodes	Number of known NetROM-Nodes
Destinations	Number of known FlexNet-Destinations
Users	Number of connected users
L7 connects	Number of...
L4 connects	Number of...
L2 connects	Number of...
Free users	Number of free...
Free L7 connects	Number of free...
Free L4 connects	Number of free...
Free L2 connects	Number of free...
Buffer	Available buffers for AX25-Pakete
Free memory	Free RAM
Used Mem blocks	Number of used Memory-Blocks
Process Switch	Frequency of the Process switch in Hz
Timer Accuracy	Precision of the Software-Timer
Bit/s	Bit/s altogether moved by the Digi

4.3.26 STOP

STOP is the counterpart of the start-command. STOP expects as parameters the PID (Process-Identification) of the background-process. This PID is shown in the first column of PS-command. The PID is shown hexadecimal and is also hexadecimal declared with stop command.
Example:

```
stop 8e59a
```

Comments:
1.) Conversd and routed are stopped by a own particular Stop-Command.
2.) At some processes, is a delay up to a minute until the process finishes.

4.3.27 SYs

The Sys-Command can only entered on the node-level and not in the box. The Sysop can itself login within the box-surrounding, with input: XSYS. Here is to be considered however that some terminal-programs, that generate the password, that password-string doesn't pass out, automatically (GP, SP etc.). After input of SY, the node spends a 5-number pay-cluster for login of the Sysop. On this occasion, the password must exist in a CFG-Date on the Node-RAM-Disk. That password-string can be long at most 80 characters. It is a good idea that there is a not under 40, so that spies out one through “helpful” spirits is impeded. The Sys-Command is like the same of TheNetNode.
After input of the command “sy” or “sys” comes back numbers of the node.

Example:

```
SY
62 36 65 13 34
```

These numbers must now be answered with the characters of the password. How does the password-procedure take place in the individual? Let's assume, that the password-string with a length of 40 signs for example following has:

```
Value-      00000000011111111112222222222333333333334
            12345678901234567890123456789012345678901234567890
-------------------------------------------------------------------
String      AX25HDLCXNETTNC3NETROMFLEXNETSIGMARINGEN
-------------------------------------------------------------------
              ^     ^  ^   ^                    ^
              4.    5. 1.  2.                   3.
```

After request SYS, the password-input-invitation of the node takes place with for example

```
12 16 35 3 9
```

Now, the password is to be confirmed with the signs corresponding valence, therefore in our example,:

```
T3R2X
```

i.e. under the value 12 is T, under the value 16 the number 3 etc The node sends no answer if the password is right or wrong. It returns only a prompt. The input can take place several times, about "listening" OMs, to impede the work. Terminal-programs like GP, SP etc are able to generate the password automatically, if it is saved and configured as TNN password (Explanations of this will found in the documentation of these terminal programs).
Additionally a logbook into the file NETROM.LOG, that registers each input of the SYSOP-Commands. Call, date and time are stored. This file can read and if possible deleted by the SYSOP if it becomes too long. The NETROM.LOG should be interrogated by the Sysop occasionally since further system-referential statements are contained in it, like for example

```
14.01.96 19:27:05 DL1XYZ  :Sysop rejected
16.01.96  9:10:34 TERM    :*** Starting (X)NET V0.16 (Jan 05 1996 21:49:24)
19.01.96 13:32:23 HDLC    :txok: FRMR to DB0BAX
19.01.96 19:28:28 DL2GWA  :Sysop accepted
```

Into the log-file, the Sysop can store also short notes. With LOG < TEXT >, only in the Sysop-Modus possible, the text is deposited in the Logfile. The logfile is passed out with the CAT-Command:
CAT NETROM.LOG

4.3.28 TERM

The RS232-port of the node can switched of by the TERM-Command. Hereby, "Process Switch " increases itself, see statistics. This command should be entered only over radio, then afterwards the TNC can be spoken to over the terminal-interface no longer. After a Node-Reset, Term is on switched in principle, i.e. the RS232-port is active.
Switch off the terminal with:

```
TERM 0
```

It is switched on with:

```
TERM 1
```

4.3.29 TIME

System-date and time of the node are put down with the Time-command. The TNC3 possesses is battery-buffered real-time-clock. If it is necessary to rearrange the time (For example to UTC) the Entry:

```
TIME 19 02 96 12 03 00
```

The sequence DD MM YY HH MM SS, therefore day, month, year, hours, minutes, seconds.

Tip: the time of the node should be put down on UTC, provided the internal TNC3BOX was activated. The representation in the box uses in UTC, indifferently, which time < MSZ or MESZ > was put down.

4.3.30 XCON

One or several users can be forbidden a thruconnect over the Digi, a (also a Via-Connect).
For this inputs the call(s) of the user(s) :

```
XCON - DG1ABC DL1ABC....
```

It is possible for DG1ABC and DL1ABC to connect that Node, but not a connect to another node or user - both gets on a connect command

```
***can´t route
```

Vice-versa, the possibility exists a Call to allow exclusively a Connect (For example : To use that node as private node). If "XCON + DL1ABC" is entered, only DL1ABC is able to connect another node or user. All other Calls get the above-mentioned message.
Positive or negative reputation-sign-entries are deleted by command XCON + or XCON – (without further argument).

4.4 Box-Sysop commands

Following Sysop-Commands work exclusively in the Mailbox. The commands resemble those of the TNC3BOX and can be taken also from the TNC3-Handbook of the company SYMEK. Merely the additional commands for the Digi-Software, is not documented in the TNC3-Handbook.

4.4.1 XAB

(eXtended Add Board) to add new public categories in the box. For example:

```
XAB TNC3
```

4.4.2 XCON = CONNECT

(eXtended CON allow)
See command-description with the Sysop-Command XCON

4.4.3 XDB

(eXtended Delete Board) is used in order to delete categories. The categories are deleted with all files. Also deleting of user-categories is possible. Therefore previously looks if important Mails still exist in the category, that should be deleted.

4.4.4 XDIR = DIR

(eXtended DIRectory). The content of the RAM-disk can be read with XDIR. Wildcards are allowed (* and ?). For example

```
XDIR * .TXT
```

listed all Files with the Extention TXT.

4.4.5 XEDIT = EDIT

(eXtended EDIT). Hereby, text files can be stored in the RAM-disk. It passes no possibility to edit text files directly. ASCII-text can produced or overwritten.

4.4.6 XERAS = RM

(eXtended ERASe) serves to the erasure of any files on the RAM-disk. It is on this occasion (for security-reasons) no Wildcards allowed. The file-name must be declared completely.

4.4.7 XLOAD = LOAD

(eXtended Load) The XLOAD-Command is used to upload a binary-file into the RAM of the node. For example

```
XLOAD NET.APL
```

By using a terminal program the transfer will be done by Binary-TX. After successful upload of the APL-File, the program can be started (See XRUN to this).

4.4.8 XPW = PASS

(eXtended PASSword) The possibility offers to interrogate the password; via radio only the password-length is displayed, otherwise the password could read by others and a password protection would be consequently invalid.

4.4.9 XREAD = READ

(eXtended READ) hereby any files can be read from the RAM-disk.

4.4.10 XRUN = RUN

This command starts a program-application loaded into that RAM of the node.
For example

```
XRUN NET.APL
```

4.4.11 XST

(eXtended Statistics) Shows the Sysop some useful statistics-information, for example how many ram is used for mails, boards etc. and how much storage still available is. With XST * all files inside the box are shown with statement of the size.

5 External commands

External commands are not necessarily required to the business of a node. Not each external command is available on each platform. Whether a command is available on a platform, can be taken the following overview:

Program	Short-description	TNC3 TNC31	Atari	PC32	PC16	Linux	Win95 Win98 NT	TNC4E
beacond	Beacon-Background proc.	x	x	x	-	x	x	x
blinkd	Lets blink the con/sta LEDs of the master TNC3	x	-	-	-	-	-	-
callchkd	Callcheck-Backgroundprocess	x	x	x -	X	x	x	
cat	Read text files	x	x	-	-	-	-	x
conversd	Ping-Pong-Convers-Backgroundprocess	x	x	x	-	x	x	x
cp	COPY-Command	x	x	x	-	x	x	x
crond	Execute timebased actions	x	x	x	-	x	x	x
Del	Del-command, Wildcards allowed	x	x	-	-	-	-	x
dump	Produce a storage-departure	x	x	-	-	-	-	x
ep_crc	Calculate EPROM-Checksum	x	-	-	-	-	-	-
fbeacon	Sends beacon fro m a file	x	x	x	-	x	x	x
flashcpy	Eprom download program	x	-	-	-	-	-	-
ls	Shows a list of files in a short term	x	x	-	-	-	-	x
out	Remote control for the Port A of the MC68302	x	-	-	-	-	-	x
pftp	Packet file transfer program	x	x	x	-	x	x	x
poke	Alteration of the storage-contents	x	x	-	-	-	-	x
ren	Renames files		x	x	-	-	-	-
routed	IP-Router-Backgroundprocess	x	x	x	-	x	x	x
rstatd	Statistics-TX via UDP	x	x	x	-	x	x	x
speed	Increases the speed	x	-	-	-	-	-	-
statd	Statistics-collector backgroundprocess	x	x	x	-	x	x	x
update	Simplified FLASH-updateprogram	x	-	-	-	-	-	x
xgate	Packet-Radio-Gateway-Programm	x	x	-	-	-	-	x
ether	Ethernet-Driver TNC4E	-	-	-	-	-	-	x

5.1.1 BEACOND

BEACOND is a program to send beacons on user-ports. In the Sysop-Mode, the Beacon-File is loaded as BEACOND.XTS on the DIGI and with the command line:

```
start Beacond
```

This line can be written down into the AUTOEXEC.NET so that the beacon is activated automatically when starting the node.

The program doesn't store the configuration of the entered beacons! I.e. with a node-Reset, no beacon is sent out anymore. It therefore recommends itself, not only start the program with the AUTOEXEC.NET, but also declare a BEACON string there. That string cannot be declared directly after START BEACOND, only after start of another Program.

The input of

```
BEACON < RETURN >
```

generates following list:

```
Subcommands are:

Name        Description

add         add beacon
delete      delete beacon
list        list beacons
```

Explanations to the Subcommands:

```
BEACON A (ohne weitere Angabe)
```

shows the help to the input of a beacon:

```
<interval [s]> <portnr> <tocall> { <viacall> } text [<beacontext>]

BEACON A 660 0 ID text DB0SYL:SYLT - ((X)NET) DAMA Duobaud 1k2/9k6
Einstieg
BEACON A 720 1 ID text DB0SYL:SYLT - ((X)NET) DAMA Duobaud 1k2/9k6
Einstieg
```

put down the beacon-text with time-interval on Port to Call.

```
BEACON L
```

listed the entered beacons and shows the next transmission additionally:

```
Beacon  1: port 1 to ID repeated every 720s.
           Next send at 15:04:09 text:
           DB0SYL:SYLT - ((X)NET) DAMA Duobaud 1k2/9k6 Einstieg
Beacon  2: port 0 to ID repeated every 660s.
           Next send at 15:09:09 text:
           DB0SYL:SYLT - ((X)NET) DAMA Duobaud 1k2/9k6 Einstieg

BEACON D 2
```

deletes the beacon 2 (on Port 0). It doesn't need to input the whole string.

5.1.2 CALLCHKD

Callchkd is a background-process which checks a call at the connect for validity. Callchkd is started with the command-consequence:

```
start callchkd [<maxcon>]
```

This line can be written down into the file AUTOEXEC.NET - then Call-Check-Daemon is activated at system-start directly. The optional parameter < maxcon > is admitted at how many connects are for an user is standard. The callcheck takes place after following rules:

- the Call must be alphanumerically
- cannot contain small letters
- must be more than two-digit (>= 3,
- at least one number must contain
- at least one letter must contain

Whom these rules don't suffice, that can deposit further lines in the file " callchk.net " to refusing Calls. The " Wildcards " '*' and '?' can be used.
Example for a callchk.net - file:

```
dn *
at *
xx0xx
dl?xyz
```

Provided the Call was recognized as closed, the file " of suspend.txt " is sent the user and then disconnected. The incident is held in the file **„NETROM.LOG“** " with date and time ".
Example for a suspend.txt - file:

```
The Call %C was closed on %Y - please connect the sysop for information
```

Whoever don't close an user completely but only would like to restrict the number of the Connects, callchk.net can declare the number of the maximum Connects for this user in the file behind the respective Call. Example for a line in the file callchk.net:

```
dl1xyz 1
```

The user DL1XYZ will allowed only one Connect (independently from the SSIDs DL1XYZ uses).

For CB in Germany, Raphael Pala wrote following Callchk.net. The commentaries in clamps must be deleted before uploading.

```
?????      (Generally invalid Calls are here excluded)
????
??1???
??2???
??3???
??4???
??5???
??6???
??7???
??8???
??9???
??0???
at?????   (Then from here the Calls with invalid initial letter)
b?????
c?????
e?????
f?????
g?????
h?????
i?????
```

```
j?????
k?????
l?????
m?????
n?????
o?????
p?????
q?????
r?????
s?????
t?????
u?????
v?????
w?????
x?????
y?????
Z?????
ds????     (From here calls with invalid 2. Letters (just only DAA-DRZ allowed))
dt????
you????
dv????
dw????
dx????
dy????
dz????
d?? 0??    (And here still the Calls with invalid first number (allowed:200-999))
d?? 1??
```

5.1.3 CONVers

The description to the Convers is to be found in the appendix (side 59).

5.1.4 CONVERSD < CONVERSCALL >

In the Sysop-Mode, the Convers-File is loaded as CONVERSD.XTS on the DIGI and with the command line:

start conversd < convcall >

started. The node-call and < convcall > should have a different SSID. The command looks at DB0SIG so:

start conversd db0sig-5

This line can be written down into the AUTOEXEC.NET so that convers is activated automatically when starting the node. A detailed description to the Convers-Mode is found in the appendix.

5.1.5 CP

Copy command:

```
cp C1.TXT C2.TXT
```

Produce a file from the content of C1.TXT with the name C2.TXT

5.1.6 CROND

Background-process to the duty of cyclic actions

Crond is started with the command-consequence "start crond" written down in the AUTOEXEC.NET file. The background-process is stopped with the command stop.
Crond reads every minute the file "crontab" (no extension!) whether is to be executed commands. The CROND implementation gets the bearings by the same-named implementation under UNIX.
The (text -) file "crontab " consists of instructions for the CROND-Process, that more or less means:

"execute this command on this time on that day“. With it the construction of the file is clear:
It consists per line of a time and a command.

Is valid in principle:

Empty-lines and leading empty-signs are ignored. Lines that begin with one ' #' will seen through as commentaries. A '#' -sign within the line is interpreted as command.

A line in the " crontab"-Date consists of five - time and date-fields followed from the command to be executed.
This command is executed if the minute, hour, and the month agree with the current time AND if at least one of the fields day (in the month) or weekday agrees with the current date. The five fields for the time are:

```
Field          Range
------         ------------
Minute         0-59
Hour           0-23
Date           1-31
Month          1-12
Day            0-6  (Sunday = 0, Monday = 1, etc...)
```

A star ('*') stands for: Always. The statement of listings is possible, the statement of 0,15,30,45 in the field minute stands for each quarter of an hour for example. Respect: In the list cannot occur empty-signs.
The sixth field in the line is the command. The command is executed with Sysop-privileges. There are no restrictions with.
Hint: The day a command is to be executed can be declared in two fields: Day (in the month), or weekday,. If both statements are done, the command is as well as executed at the stated weekday also at the stated month-day. The line

```
30 4 1,15 * 5 msg all Hello on all sides
```

would executed at 4.30 at the first and at the 15ten of the month and additionally every Friday at 4.30.
Some (useful ?) examples of crontab-entries:

```
#At the 1.1. at 0.00 o'clock executes, weekday no matter:
0 0 1 1 * msg all toast New Year's day!

#Always at night at 0.30 o'clock
30 0 * * * msg all Now it´s time to go into bed!

#Working day from 16.30 o'clock - Activates DAMA Connectslot, 3 seconds,
30 16 * * 1,2,3,4,5 dama dslots 3000

#From 22.00 o'clock DAMA - Connectslot off
0 22 * * * dama dslot 0

#every Sunday, 10.59 o'clock Userport off and round-saying on
#the out-Commands are written in the file phonie.net
59 10 * * 0 exec phonie.net

#every Sunday, 11.31 round-saying off, node switch on
#the out-Commands are written in the file phonie.net
31 11 * * 0 exec digi.net

# Reminds the user at ham-meeting
25 11 * * 0 msgs all the ham-meeting begins in five minutes on 144.575 MHzes

#Off duty because of Maintenance-work at the 1.4. 13.00
#Informs Users from 12.30 o'clock and at 13.00 o'clock down-drives software
30,45,50,55,56,57,58,59 12 1 4 * msg all Attention! Off duty at 13.00 o'clock.
0 13 1 4 * prgexit

#Month-statistics of statd wegspeichern
0 0 1 * * ren port.sta vormon.sta
```

5.1.7 CVSTOP

PP-Convers is switched off with CVSTOP.

5.1.8 DEL

DELete deletes Files on the RAM-disk of the node. Wildcards * are allowed - therefore “CAUTION” with the erasure!

5.1.9 FBEACON

FBEACON sends out a file, Max 256 signs, as beacon. The call is very simple:

```
FBEACON <File> <PortNr> <Call> [<via>]
```

After the transmit, the program finishes itself again. In order to send out periodic beacons, FBACON can use together with the CRONDemon.

Example:

```
fbeacon info.txt 1 BEACON
```

5.1.10 PFTP

(Packet-File-Transfer-Program)

PFTP, like the FTP with TCP/IP-Sessions, serves the transfer of files. Via PFTP, a Connect is built between the node and a destination.
The external program is started with the syntax:

```
PFTP <call> {viacall}
```

Call is the station that will connected via the node (For example a mailbox a packet-station). The connection can also be done “via” several stages. Comments of the connected station is passed out with preceding Call:

```
DL2GWA-3|** CONNECTED WITH DL2GWA-2 - WELLCOME
DL2GWA-3|HALLO OM...
DL2GWA-3|
DL2GWA-3|You are connected to DL2GWA, OP:Manfred, QTH:Sigmaringen/Donau (JN48OC).
```

As soon as the connection established between the node and the Packet-Station, with one <RETURN> the command-list is ordered (Available commands). Possible inputs within the PFTP-Action are:

```
Available commands
 b)bye  quits pftp
 l)en   <paclen> sets paclen for transfers
 p)ut   <file> transfers file to remote host
 q)uote <cmd> sends command <cmd> to remote host
 t)est  <#byte> sends random bytes to remote host
```

B = Bye finished the PFTP-Session
L = L is decided Paclen for the data transfer of the node to the target destination.
P = PUT-Command and file-name sets the filename to transferred.
Q = Quote serves calling commands from the Targetcall
(for example //WPRG at Hostmode-Programs or send-command at a mailbox).
T = <BYTE> declared how many bytes are transferred to the connected station.
Is useful, to test a link for maximum throughput.

Linktest between (X)NET-Digis with PFTP:

```
pftp < nodeneighbour >
q null
t 10000
```

Input of a B finishes the PFTP-session:

```
pftp session ended
```

5.1.11 POSTATD

POSTATD is a statistics-program with direct retrieval-possibility. The background-process is started with

```
start postatd
```

and stopped with the STOP-Command. After it a command POStat exists for each user, which passes out a Port-statistic,. The measurement-interval is solid set for 10 minutes. I.e., the measurements can be interrogated only 10 minutes after the start of " postatd ".

Syntax:

```
pos [<portnr>]  ['*']
```

Without parameters, “pos“ pass out the statistics of all active Ports. With <portnr> a overview of the measurements is displayed of the last hour. With '*' takes place this announcement for all active Ports.

5.1.12 ROUTED

The IP-Router is activated with START ROUTED.

5.1.13 RSTATD <sec>

The background-process of Rstatd allows it, regularly all 10 minutes to transmit the node-statistic via UDP/IP to a statistics-collector. This has the advantage that no storage area is required on the node itself for the statistics. As collective-calculator, a Linux-PC can be used on which also an on-line-evaluation of the data is simultaneously possible via the postat.cgi-Program.
Rstatd is started with the start-command. It must be declared with IP-Nr. of the statistics-collector and the transmitter-address (IP-Nr of the node) :

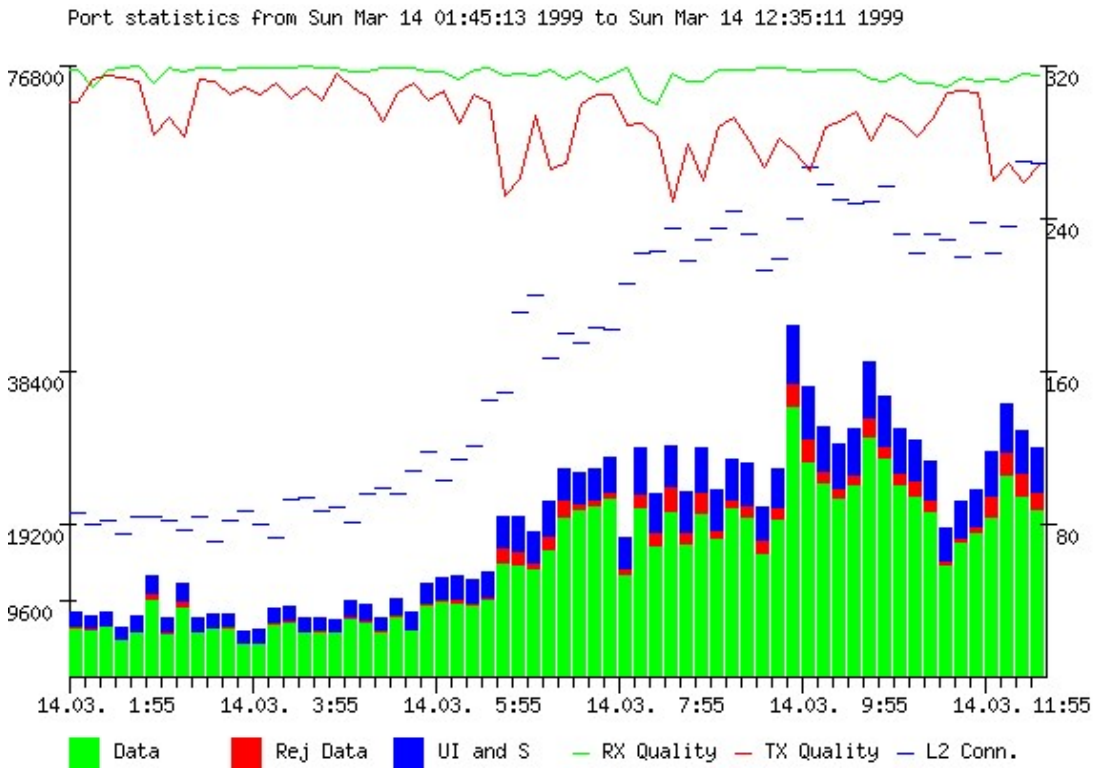
Syntax:

```
start rstatd <Destination-IP> <Source-IP>
```

Example:

```
start rstatd 44.130.55.100 44.130.55.115
```

This suffices to send all necessary statistics-data to the collector, here 44.130.55.100. Important: Of course the (X)NET-IP-Router must be active because of using UDP/IP. For this reason, the automatic start of rstatd should be written down into the file " IP.NET ".



Statistics-evaluation with “postat.cgi” over a Web-server

5.1.14 STATD <sec>

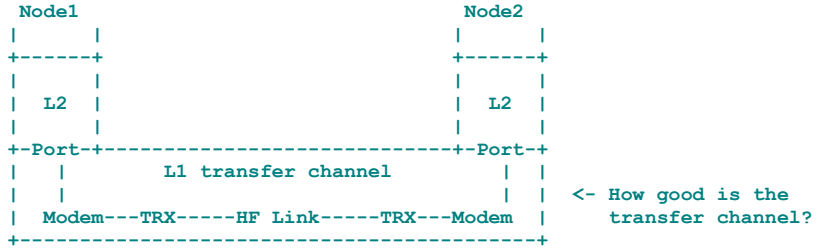
Statd is already since (X)NET version 1.11. Now **statd** can be started twice or more in order to get different measurements in different intervals. To enable this a additional parameter is given to set the announcement-file name.

Examples:

```
start statd              #hourly saving in file port.sta -
start statd 60 min.sta   #minutely-statistics saving to file min.sta
start statd 43200 12h.sta #12 hours statistics saving to file 12h.sta
```

5.1.14.1 The Portstatistic achieves what

(X)NET Port-statistic collects basis-data about the quality of a link. Formulates precisely: It is judged the quality of the layer 1 component (transfer-channel), between two nodes. The question how good modems and TRX are answers by the (X)NET Port-statistic.



5.1.14.2 Collection of the relevant data

In the practice, all possible data are collected at different node-systems about a link today:
Connects, QSOs, User, Quality, RTT, RR/REJ/I, TX-Bytes/RX-Bytes, etc...
It first places itself the question with it: which data to the judgment of a link - hardware (transfer-channel) is interesting at all? What must I know about my Link?
Lot of statistics-information is available but only one single value is relevant: The bit-error-probability. That alone is sufficient to the judgment of a HF- transfer channel. It is defined as:

$$\text{Bit-error-probability} = \frac{\text{Number of bit-errors}}{\text{Number of transmitted bits}}$$

Aim of (X)NET-Statistic is it to determine this value through an passive purely observation of current AX.25-links (Layer 2). One can calculate an estimated value for the bit-error-probability from the relationship between the number correctly transferred usefulness-data-bits and the number of repeated data-bits. The contemplation of the sent and repeated bits and not the number of repeated HDLC-Frames is essentially with it. (Often the relationship is calculated from I-Frames to REJ-Frames - an absolutely questionable value.

5.1.14.3 Collection of the data in the temporal course

Each Sysop must be able to look to the behavior of a link in the temporal course. In the practice, the Sysop experiences that a link badly runs to certain times or with certain weather-situations. In these cases, it is ideal for the Sysop if he is be able to look precisely to these times later on the Link statistic.

5.1.14.4 Collection of further analysis-data

Beside the judgment of the bit-error, there is of course still other interesting values like for example the TX and RX trough put according to time...

5.1.14.5 Doesn't collect...

How already mention, other implementations make a multiplicity from data available. Often it is not clear where the values come from and how they are be interpreted. (X)NET restricts itself to the data, that are impossible for the Sysop, and stores these values in a very compact form as well so that the hourly storage of the Port-statistic represents no problem over month away.

5.1.14.6 Other values

The RTT-values definitely are not usable for the judgment of the transfer-channel, since these values increases because of bad links AND/OR high load.

5.1.14.7 Features of Statd

- Statistics-collection fully automatically: the Sysop don't need a PC running the whole time.
- The statistics itself generates no Traffic, like (for example) telemetric-beacons
- The storage of the basis-data takes compact place
- Any evaluation with spreadsheets, for example: Excel
- Documented file-format incl. example-evaluation program existing
- Statistics-collection also beyond node-resets possible

5.1.14.8 Installation

The collection of the statistics is started with command:

```
start statd 3600
```

Statd is a background-process, that stores the statistics-data in the node cyclically. As parameters, the duration of the measurement intervals is declared in seconds, here 3600s = 1h. In principle, any values

from 15 seconds up can be declared here. Whoever is interested in month-statistics can have the statistics also stored only once daily, 86400 sec = 1 day.
With 3NET and STNET, the file STATD.XTS must be uploaded on the node before. With LINU(X)NET and 32-bit PCNET version is STATD installed as a Sysop-Command.
After some measurements, the file port.sta is found on the node. In order to do an evaluation, this file is downloaded via HF to the PC with the command:

```
rbin port.sta
```

With help of the program PORTSTAT.EXE the file is converted into a text file:

```
portstat <port>
```

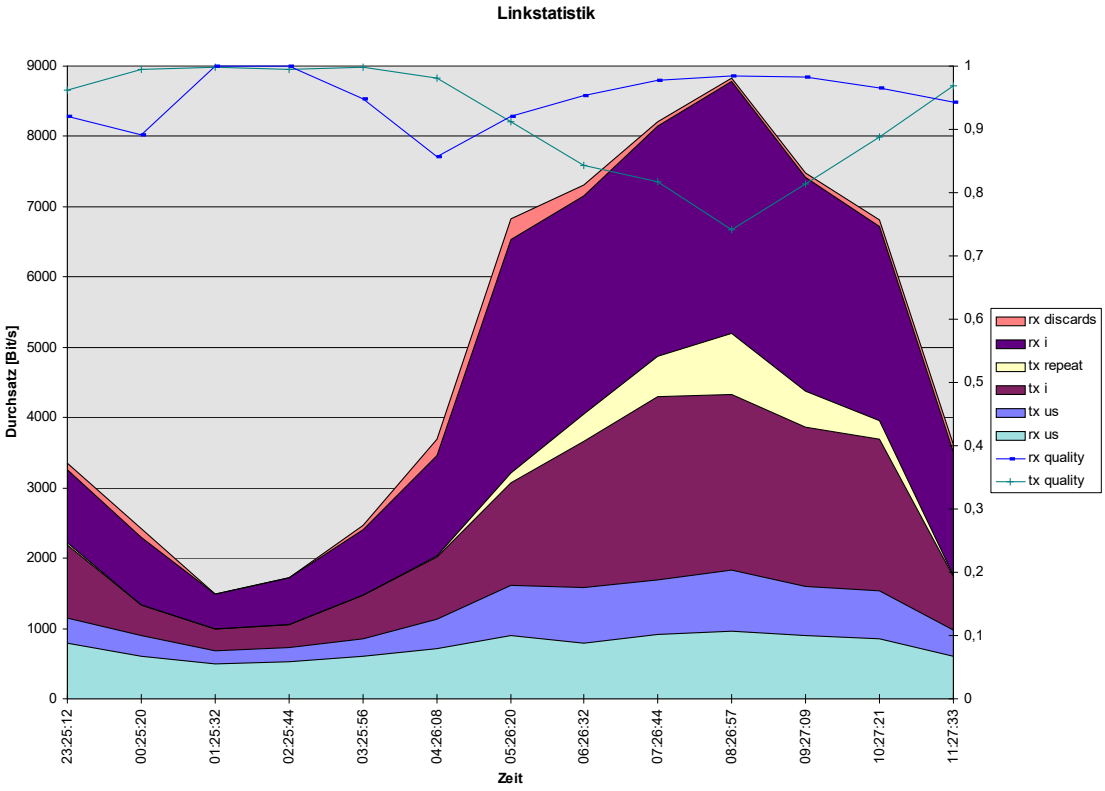
The result now stands in the file PORTSTAT.TXT, which is very simply with readable and evaluate by (For example) Excel .
As example is the file " POSTAT.XLS " is contained in this archive. It shows the link-situation on the 19200 duplex-link between HB9AK and DB0HP.
Of course, the procedure can be used also on user-ports, also with DAMA.
With Linux, the evaluation of the statistics-file can take place also with help of a CGI-Program via a Web-server.

5.1.14.9 Description of the calculated Kenn-value in the Excel-Diagram

Statement	Description
rx discards	Unnecessary (and therefore discarded) repetitions of Info-Frames
rxi	Correctly received Info-Frames
tx repeat	Repeated Info-Frames
txi	Correctly sent Info-Frames
tx us	All other transmissions (RR, SABM, UI)
rx us	All other received frames (RR, SABM, UI) inclusive Info-Frames that only was heard

All values are declared in Bit/s. The sum of all values corresponds to the hole throughput of the ports. In the surface-diagram, this throughput is directly readable as most upper restriction-line.

5.1.14.10 Example of an EXCEL-evaluation



5.1.14.11 Evaluations

The connection-qualities are calculated:

$$\text{tx quality} = \frac{txi}{\text{tx repeat} + \text{txi}}$$

$$\text{rx quality} = \frac{rxi}{\text{rx discards} + \text{rxi}}$$

For the bit-mistake-likelihood is valid:

$$\text{Bitfehlerwahrscheinlichkeit} = \frac{\text{tx repeat}}{\text{txi} + \text{tx repeat}} = 1 - \text{tx quality}$$

5.1.15 XGATE

XGATE is an external program that can do automatic Connects and information-transfers.
Xgate is used for example:

- Link in a DX-Cluster into a Convers-Channel fully automatically.
- Connects Convers-Channel together
- Sets up fully automatic connects, send data and disconnect again.

The respective to executing actions are deposited in a script-file, that must be called as parameter at start of xgate.
Following script connects the TNC3BOX of DL2GWA and stores the current node-statistic as mail to him:

```
a:onstart       i     db0sig
a:onstart       c  a:  dl2gwa-8
```

```
a:onconnect     q a: s dl2gwa Statistik
a:ondisconnect b
a:onconnect     c b:db0sig

b:onconnect     q b: s
b:onconnect     q b: q
b:ondisconnect  q a: ***END
b:ondisconnect  q a: quit
b:oninfo        t a:
```

Following script connects the DX-Cluster HB9W-8 with the convers-channel 9000 and passes out all received DX-messages into the convers.

```
##########################
# Verbindung zu hb9ak-11
##########################
a:onstart        i hb9ae-2
a:onstart        c a: hb9ak-11
a:onconnect      q a: conv 9000
a:onconnect      q a: /top HB9W DX cluster convers update service:
THIS IS A TEST
a:ondisconnect   w 60
a:ondisconnect   c a: hb9ak-11
##########################
# Verbindung zu HB9W-8
##########################
b:onstart        i dl1gji
b:onstart        c b: hb9w-8
b:ondisconnect   q a: Sri, connection to HB9W-8 broken
b:ondisconnect   w 60
b:ondisconnect   c b: hb9w-8
b:onconnect      q a: Connected to HB9W-8
b:oninfo         t a:
```

5.1.15.1 Channels

(X)Gate puts altogether four channels

at:
b:
c:
d:

for any connections to the disposal.

5.1.15.2 Events

Event	
onstart:	Causes when starting the program
onconnect	If a connection has established
oninfo:	If info have arrived
ondisconnect:	If the connection was disconnected

5.1.15.3 Commands

One of the following commands can be caused with each event:

Command	
i < Call >	Sets the Call on the channel
b	Closed XGATE
c < channel > < Call >	Start a connection-construction on the stated channel to < Call >. Also vias or port-numbers can be declared.
w < sec >	Wait the stated number of seconds
q < channel > < text >	Write the text into the stated channel. The text is sent only then if the channel is so connected.

t < channel >	Works only in accordance to the event " oninfo " and hands over the received information to the stated channel.

5.1.15.4 Principal construction of the script-file

The script-file is built as follows:

```
<Channel> <event> <command>
```

Meaning: If on <CHANNEL> <EVENT> happens, does <COMMAND>
Per event and channel more than one row can be written if necessary. You/they are worked off in the sequence of her/its/their appearance.

5.1.15.5 What doesn't go

XGATE cannot react of received data (not now!). XGATE can react only to the events described above.

5.1.15.6 XGATE Start

xgate is started as background process with the syntax:

start xgate [Scriptfile]

provided no script-file is declared, "xgate.net" is used as standard.
XGATE can be closed event-controlled - however also can be finished with "stop command“ by sysop.

6 Text files and text-macros

First still fundamental implementations to the help-texts, connect-texts, disconnect-texts and individual information-texts, that can be loaded into the node. Text files either can played in from the node-platform or from the Mailbox onto the file-system of the node. The command within the box is

```
XEDIT <Dateiname.Ext>
```

In the node-level, the command is: EDIT.

```
EDIT <Dateiname.Ext>
```

The invitation follows after input of the command:

```
PSE type contents for <filename.Ext>. End with ^Z
```

The ASCII-text file can be transferred after it. The Textfile is finished with CTRL-Z and is stored in the RAM-disk of the node.
Following Extentionses are to be heeded:

HLT = Digi-Help with input of Help + command
HLP = Box-Help with input of Help + command
INF = Info-texts (AKTUELL.inf, INFO.inf)
TXT = Ctext/Dtext/NEWS etc
NET = Script-Data
CFG = Binary, not editable files (configuration-files),

A CTEXT can be produced individually for each Port. In each case for a Port must be existing a valid Ctexts, for example C1.TXT = Connect-text on Port 1. A global for all Ports working text is produced with C.TXT and stored on the RAM-disk. As well, the disconnect-texts, that can be produced for each individual Port, are for example D3.TXT = Disconnect-text on Port 3. D.TXT works for all Ports on the other hand globally. CTEXT.TXT and DTEXT.TXTs must exist for the TNC3BOX in each case.
Text files on the RAM-disk with the extension HLP work as complementary help-texts within the mailbox, for example SEND.HLP shows a help about the Command SEND.
Help-texts, that appear only on the node-level, are to be stored with the extension HLT; info-texts with the extension INF. These Help-/Info-texts cannot be interrogated on the mailbox-level however; help-texts is to be entered with the extension .HLP there.
If Sysops feels that the help list from (X)NET appears too long and unclear, can produce an individual help list by himself. This text file **must** be named HELP.TXT. However this list must be edited manually if a node update is done or a new external program is started. In contrast to the own produced HELP.TXT new commands supplements automatically on (X)NET-internal help list.

Text-macros can be used in all these texts. If these text-macros should be effective with the announcement, it is important to load the texts binary in the node. Instead of command EDIT the command LOAD is to be used to upload these file (For example: **LOAD C.TXT)**. After invitation of the node, the Text-File C.TXT is to be sent binary. Reason: Many Packet-Programs replaces "%" –text-macros with there own texts!

Text-macro	Replaced by
%C	User-Call
%c	User-Call with SSID
%Y	Digi-Call
%y	Digi-Call with SSID
%P	Port-number

%p	Port-name
%D	Date
%T	Time
%V	Version-number
%N	Name
%F <file>%	Calls another text file

Backslash-signs in the the text, to insert, following Escape-Sequences are valid:

Text-sequence	Spent sign
\b	Backspace
\n	Linefeed
\r	Return
\a	Bell
\t	Tabulator

7 Own commands: macro-stack-files

Macro-files are simple ASCII-Files, that are worked off by the node with the call of the file. It is possible to do a connect to a mailbox or cluster only by doing a short command. The file name is freely selectable but must have the extension: *.MAC. The file-name cannot be longer than 8 signs. Also it spend attention to the Macro-name because there has to be no similarities with an existing command. Therefore M as name is not enough since this would collide with MH. An example:

File DX.MAC, following command line is written down:

C HB9W-9

Through the command „DX“ at the node-prompt a connection the DX-Cluster HB9W-9 will establish. This command can be used by each User. In order to connect the next reachable mailbox edit the file BOX.MAC or MBBS.MAC “C <BOXCALL>.” For example:

C DB0CZ

The user-command BOX as well as MBBS connects the user to the mailbox without knowing the call of the box.
Furthermore, also individual SysOp-Commands can be executed from the user without SysOp-authentication: Write the command SYS in front of the command to be executed

Example for PIC.MAC:

SYS RBIN PICTURE3.JPG

After user-command “PIC” the SysOp-Command RBIN is called and sent out a picture of the node auto-binary. No further SysOp-commands can be executed from the user after.

Example 1: Local mailbox

```
M.MAC content: C DB0CZ
```

Calling this macro with input of „M“. A Connect takes place to the mailbox DB0CZ.

Example 2: DX-Cluster

```
DX.MAC content: C DB0SDX
```

Calling this macro with input of „DX.” A Connect takes place to the DX-Cluster DB0SDX.

Example 3: Sysop-Statistik

```
STD.MAC content: RBIN PORT.STA
                 RM PORT.STA
```

Calling this macro with input of „STD“. It follows the binary download of port-statistic with deleting the file after that. Attention: Macros could be called by all users of the node!

7.1 Command-line-parameters in macros

Within a macro, parameters can have declare them/her/it of the users behind the macro-command, is used. (X)NET replaces the macro-variables $1, $2, $3,.. , $9 and $@ through the parameters from the command-line. Stands $1 with it for the first word after the macro, $2 for the second word and so on. For the entire line after the macro can $@ is used.

Here an example like with help of parameters in macros the retrieval of a Call database could look. The user gives after the macro the to sought Call one. An external program “call-info” determines the data to the Call then:

```
=> whois dl1xyz
Makro Whois mit erstem Parameter dl1xyz.
Call      : dl1xyz
Real name : Max Mustermann
QTH       : Musterstadt
Locator   : JN48PB
```

The necessary(X)NET-Makro sees like follows:

```
WHOIS.MAC content: #call of the Call-Datenbank
                  ECHO macro Whois with first parameter $1.
                  SYS SHELL /USR/BIN/CALLINFO -V $1
```

The external program callinfo is called by the SHELL-Command. The to sought Call is handed over $1 with help of the macro-variables at the program callinfo.

8 Literature-table

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10 Appendix

10.1 The Convers-Mode

Ping-Pong-Convers-Modus offers to connect Convers-Node the possibility among each other, i.e. a Convers-User doesn't must itself over a long Node up to the Convers-Node connect, on which his/its wished conversation partners are, but it suffices if a Connect is made to the next Convers-Node, that the CONVERS-Host-Protocol developed by DK5SG backed. To it counts besides FlexNet, WAMPES also TheNetNode - and now also(X)NET-Nodes. Between the Convers-Hosts, all texts, that write the different User, are separated transferred for each user no longer. This unburdens the Links perceptibly, since (For example) one and the same Packet for 10 user via the Interlinks not 10 times transmitted now only one!
Still the CONVERS has become of course essentially bigger and we can assume that we now finds a conversation partner in Convers more frequently.

The user comes into the Convers-Mode:

```
conv
```

or

```
conv <Channel>
```

Example:

```
= > conv 32767
```

conversd @ db0sig PingPong-Release 3.12 ((X)NET) - Type /HELP for help.
*** You created a new channel 32767.
*** (10:58) conversd made you a channel operator for channel 32767
*** Personal text and data set.

Then, the following commands are available:

```
/Away [text]              marks you as absent
/ALl text                 text to all user on your channel
/Beep Beep-Modus          on/off
/Channel n                changes to channel of n
/CHARset [purely [out]]   puts down sign-transformers (ANSI is default)
/Destinations             lists avaiable ping-pong Hosts
/EXClude User text        sends text to all on your channel besides User
/Filter [Calls]           puts down Calls, whose texts should be filtered,
/Help [command]           gives help-information about command
/Invite User              invites User on your channel
/Links [args]             lists or established (Sysops) conversd-link-partner,
/LISt                     lists all channels and their topics
/LEave [channel]          leaves channel or present channel
/Msg User|#Kanal text     sends text to User or connected channel
/ME text                  sends an action-text
/MOde [channel] options   puts down channel-options
/NOtify [Calls]           puts down Calls, whose appearance should be reported,
/Personal [text]          puts down personal description (saved on the node)
/PRompts abcd Prompt      put down a=Query b=Normal c=Ctrl-g d=Ctrl-h
/Quit                     left convers
/QUEry [User]             started/closed private conversation
/Topic [#Kanal] [text]    puts down topic of the channel
/UPtime                   howlong already runs this conversd at all?
/Verbose                  Laber-Modus an/aus
/VERSion                  shows info to this version
/Who [N|*|A|L|U | @]      shows User and their channels
/WIdth [value]            set/shows line-width
***
```

10.1.1.1 Convers - commands

Commands can be abbreviated by input of the upper-case letters.

10.1.1.1.1 /ALL text - text to all user of your channel

If you are in the /query mode, text is treated with preceding /all as you would work without /query.

10.1.1.1.2 /Away [text] - marks you as absent

/away puts down the absent-ness-text, that the others can read. With the call without argument, the text are be deleted and you are present again.

10.1.1.1.3 /Beep - Beep-Mode on/off

(/beep /bell)
The bell-sign (^G), which can be sent before each communication, becomes hereby a - or turned off. This command is actually a subset of the /prompt command, sees there.

10.1.1.1.4 /Channel n – join to channel

(/channel /join)
Join additionally with the wished channel. In contrast to older coversd-Implementation, one remains in the prior channel as well, because a multiple-channel-connection is supported. Too abandoned around a channel, you " must use /leave ". Without statement of a channel, info are passed out to the channels used by you.

10.1.1.1.5 /CHARset [in [out]] - puts down sign-transformers, ANSI is default,

With this command, you can tell the Convers you would like to have which font-change. The syntax is /char [In-Typ [Out-Typ]]. If (for example) you are working with a Atari ST, you would input "/char atari". If you would like to use a PC and would like to write umlauts in the TeX-Stil, /char tex pc " inputs ". Play a little with this function. Less of the typ of PC but the font is important here, that the used program used.

```
Eingabe: /char
*** Charset in/out is iso-8859-1/iso-8859-1.
```

Shows the default. The representation can become change with:

```
Eingabe: /char ibmpc
*** Charset in/out set to ibmpc/ibmpc.
```

Possible emulators are:

```
iso-8859-1, ansi, 8bit
dumb, ascii, none, us
tex
ibm7bit, 7bit, commodore, c64, digicom
roman8
ibmpc, pc, at, xt
atari
binary, image
```

10.1.1.1.6 /Destinations - lists attainable ping-pong Hosts

(/destinations /hosts)
All Pingpong-Hosts, that are interconnected, are displayed. The numbers shows the answer-times in seconds as well as minutes.

```
Host: /d
db0dtm    (pp-3.12x)  3m   db0gv     (pp-3.12f)  1m   db0id     (pp-3.12x)  3s
db0prt    (pp-3.12f) 24s   db0rbs    (pp-3.12f)  9s   db0ulm    (pp-3.12 )  8s
db0zka    (pp-3.12f)  2m   oe7xbb    (pp-3.12f)  3m
```

10.1.1.1.7 /EXClude User text - sends text at all on your channel besides User

(/exclude /imsg /iwrite)
This command is the opposite of the /msg command. Hereby, you send text to all User of this channel besides the one as first parameters stated. Since the text is sent internally as private text at the others, is incriminated something the left more: -)

10.1.1.1.8 /Filter [Calls] - puts down Calls, whose texts should be filtered,

If you would not like to read the texts of certain User, so you can insert them into a list hereby. All texts are filtered then, with personal texts (/msg "), a feedback is sent at the sender.
The set/remove happens like with " /notify ", therefore for example "/filter + dl1abc - dl9xyz" added dl1abc and removed dl9xyz from the list.

10.1.1.1.9 /Invite User - invites User on your channel

An invitation is sent to the named User. This invitation is escorted by the entire network. If the user is on another channel and your channel is furnished as private, so he can join to your private-channel. If he is on the node level, so he receives the invitation, he cannot come directly to your private-channel because
In this case he has to be invited on convers-level again.
The invitation is sent out also on the node-level provided the relevant User is connected and is not in the Convers. If the User is connected to the next node he receives the info after reconnect.

10.1.1.1.10 /LEave [channel] - leaves channel or present channel

With this command, you can either leave the present or the stated channel. If this is the last, conversd is left.

10.1.1.1.11 /Links [args] - lists or established (Sysops) conversd-link-partner,

The momentary Link-status is shown. This is normally Hostname, Link-status, terms, version-codes and status-time, followed (if convers-link is broken) the time of next try to connect and number of tries since the link was broken, the queue and byte-statistics are shown at an existing connection. If you are Sysop, you can add or delete a convers-link. The connection-way is then as well additionally indicated in clamps.

```
Syntax: /l [[-] Host [Port [via]]]

Eingabe: /l
Host      State        Quality Revision  Since NextTry Tries Queue    RX    TX
db0id     Connected     7s/2s  pp-3.12x  23:55                 0  153K    0K
(DB0ID)
```

10.1.1.1.12 /LISt - lists all channels and their topics

All channels, their topics, options and users are shown.

10.1.1.1.13 /ME text - sends an action-text

(/me /action)
This command is used to show users an activity on your channel. If (For example) you send "/me yawns" all users on this channel are shown:

```
*** dl1xyz yawns
```

10.1.1.1.14 /MOde [channel] options - puts down channel-options

The fashion-command is one of the complicated. It becomes like follows used:
/mode [< channel >] < +|-><t|i|s|m|p|l|o < User>>.
The options mean following:

```
t - the topic of the channel has altered itself ONLY from Channel-Sysops
i - the channel is concealed Users of other channels
```

```
s - the channel is secret, the channel-number is shown no longer
m - the channel is presented, only Channel-Sysops can write
p - the channel is private, one requires an invitation to the channel
l - the channel is local, texts don't become further-distributed
o < User > - does <User> becomes a channel-Sysop (no - possible)
```

The plus puts down an option, that line deletes, she/it. Combinations are allowed it, so /mode would cause 69 -s+todl9xyzes " following: channel 69 is no longer secret, but the topics can be put down only by the Kanal-Sysop. Additionally, dl9xyz becomes a Channel-Sysop.
The present options are shown without statement of parameters.

10.1.1.1.15 /Msg User|#Channel text - sends text at User or interconnected channel

(/msg /send /write)
Send a text at a particular User or at one interconnected channel. If the text should go at a channel, so one must input " following: /msg #< channel > < writes >." If the destination is an User, so he/it can recognize the text by the additional starlets. FOR EXAMPLE if dl1gji sends a msg to dl2gwa with

```
/m dl2gwa That is a test
```

so dl2gwa gets following:

```
<*dl1gji*>: That is a test
```

10.1.1.1.16 /NOtify [Calls] - puts down Calls, whose appearance should be reported,

You are informed if a certain person appears in the person-list in the convers. FOR EXAMPLE added "/notify + dl9xyz" dl9xyz into the list, "/notify - dg1gep" removed dg1gep from the list. The adding/removing of several Calls in a command is possible, z.b. cause " /notify + dl9xyz dg1gep - dg8gad dl1gwx +dg3kcr ", that dl9xyz, dg1geps and dg3kcr are inserted and dg8gad and dl1gwx are removed. Removing of Calls, that won't stand in the list, ignored.

10.1.1.1.17 /Personal [text] - puts down personal description

, /note /personal,
A short description can be put down to your person that the other User can see with " /who ". Z.B ": /pers Fred, Sigmaringen, JN48OC ". Without text, the description becomes blank.

10.1.1.1.18 /PRompt abcd - promptly puts down a=Query b=Normal c=Ctrl-g d=Ctrl-h

The prompt-command takes four arguments in an interrelated sign-chain. " /prompt abcd " puts down " at " as " /query"-Prompt, b " for the normal prompt. d " is a sign about the prompt delete, therefore normally Backspace (^H) or Delete. c " is a sign, which is sent before each text, that you receive, (normally therefore ^G).

10.1.1.1.19 /QUEry [User] - start/stop private conversation

The stated user is the only recipient in future for all texts, that you input. These are sent as private texts at the User then, as with " /m ". To turns this off send command without argument, and everything goes again like before on that channel. This is a private-mode.

10.1.1.1.20 /Quit - convers leaves

, /bye /exit /quit,
If you input that, you leave the Ping-Pong-Convers.

10.1.1.1.21 /Topic [#Channel] [text] - puts down topic of the channel

Hereby, a topic can be put down for the channel. The other User can see this if they " input /who " or " /list ". If no channel-number is declared, so the topic of the active channel is put down. If a number is declared, so you have to be also on this channel. If no topic is declared, so the topic of the channel would deleted.

10.1.1.1.22 /UPtime - howlong has this conversd been running?

```
*** conversd@db0sig is up for 23 hours, 32 minutes, 38 seconds.
```

10.1.1.1.23 /Verbose – Login Mode on/off

Switch the Login notification-Option on/off. You receive then many information over actions of the User, incoming/outgoing/sets texts /...), even if these are not on your channel.

```
Eingabe: /ver
*** Verbose mode enabled
*** (11:01) dg3xy@db0eam left channel 55 (link failure).
*** (11:01) db8xx@db0bro joined channel 0
    (* Heiner * Diepholzingen * (JO42eo) * Z99 *)
```

10.1.1.1.24 /VERSion - shows info to this version

Show the version-number of the PP-Convers-Software (in English).

```
*** conversd PingPong-Release 3.12 ((X)NET)
  This conversd implementation was originally written by Dieter Deyke
  <deyke@mdddhd.fc.hp.com>. Now I am maintaining this derived source tree
  Report bugs to me, Fred Baumgarten <dc6iq@insu1.etec.uni-karlsruhe.de>.
  AmPR-Net address is <dc6iq@db0sao.ampr.org>. Have fun - 73, Fred
  Implemention to TheNetNode by <dl1xao@db0hbs.#hh.deu.eu>.
  Implemention to (X)NET by <dl1gji@hb9os>.
```

10.1.1.1.25 /Who [N||A|L|U | @] - shows User and your channels*

(/users /who)
This command shows the convers User and has several options:

```
n [channel]   tabular representation    (on a channel limitable)
at [channel]  absent-ness-list          (on a channel limitable)
l [channel]   detailed list             (on a channel limitable)
u Userliste   detailed info about the usern out of the userlist
* [Channel]   list of Idle              (own or stated channel)
@ Host        on host restricted tabular representation
```

without option, the short representation same as with " /list ", spent.

```
Eingabe: /who
Channel Flags  Topic
        Users
     0  T      -- velkommen - welcome - willkommen -
        dl1gji(@) .....
32154   PTI  ..........   (X)NET-convers-test
        dk1fx(!) dl3lk
32767   dl2gwa(@)
```

(@) means, that the topic of the channel of this call can be pretended, (!) mean that this convers-user has logged in as Sysop.

```
Eingabe: /who l
User    Host   Via    Chan.  Login Queue     RX      TX
dk1fx@  db0dtm db0id      0   8:33     0      13       2
        Last Activity:  10:24
dl2gwa  db0sig            0   9:03     0      14       1
        Last Activity:  10:25

Eingabe: /w *
User    Host   Via    Chan.   Idle Personal
dl2gwa@ db0sig        32767     3m Manfred, Sigmaringen/Donau, JN48OC
dk1fx   db0dtm db0id            1m Peter, Heide (jo44ne)
```

10.1.1.1.26 /WIdth [value] - set/shows line-width

Sets your conversd screen-width (characters/line) known. All msgs of the other are now shown in the new length. Default is 80. This setting is stored on the node like the command " /pers " (sees there).

10.1.1.2 Installation of Conversd

In the Sysop-Modus, the Convers-Help-File CONVERSD.XHF is loaded with EDIT CONVERSD.XHF to the node. Since (X)NET v1.10 the Convers-File CONERSD.XTS is already in the Flash-EPROM and is started by command line:

```
start conversd <convcall>
```

The node-call and <convcall> should have a different SSID. The command looks at DB0SIG :

```
start conversd db0sig-5
```

This line can be written down into the AUTOEXEC.NET so that convers is activated automatically when starting the node.

The hostlink to the next convers-node is set (by sysop) in the Convers-mode with the command-input: (For example)

```
/l db0id [port [via]]
```

The statement of the port-number is meaningful since a connect is tried with a reset on the default port (entry) otherwise. The connection is established and could be checked with /l:

```
Host      State        Quality Revision  Since NextTry Tries Queue    RX    TX
db0id     Connected     7s/2s  pp-3.12x  23:55                 0  153K   90K
(DB0ID)
```

If Loops appear between two linked Convers-(X)NET-Nodes, at one of the both is the port number dummy-port 254 (For example /l db0id 254).

Convers can be deactivated by the Sysop. Input in the node-level:

```
cvstop
```

The background-process is switched off and can started again with.... sees above.

10.2 (X)NET platforms

(X)NET is available for following platforms:

Version	Platform	Prerequisites
PCNET16	MSDOS	For PC from 286 with min. 1 MB main memory
PCNET32	MSDOS	For PC from 386 with min. 8 MB main memory
NTNET	Windows NT, 95, 98,	More than 8 MB main memory
STNET	ATARI ST	From 1040 ST
3NET	TNC3, TNC31, TNC4	with 256K RAM, 1 MB commendable
LINUXNET	Linux	From Linux-Kernel version 2.0

10.2.1.1 PCNET16

This lean-version from (X)NET is thought for small Digis, that is built from old PCs. On the basis of the restrictions of DOS, some (X)NET-Functions are not available.

10.2.1.2 PCNET32

With help of the gnu-compiler, this version can also under DOS use storage more than 640KB. It uses that 32-bit command of the Intel-386 processor and is therefore very fast. In the practice with this version
occurs problems with the serial COM-ports. Ideally, this version is suitable with the application of Vanessa-cards.

10.2.1.3 NTNET

The NTNET-Version again therefore still not yet so tried. It is a real 32-bit-application and uses the Multithreading of NT. The NT-version runs easily under Win95/98. With NT, there are problems with the serial driver of Microsoft.

10.2.1.4 STNET

The (X)NET-Version for Atari ST. Usable to only one serial interface.

10.2.1.5 3NET

3NET uses the TNC3 with his RISC-Communications-Controller completely. With 3NET and the TNC3, nodes can be built with lot of configurations. With practical tests, throughput were achieved in the mega-bit-area.

10.2.1.6 LINUXNET

Linu(X)NET offers finished serial protocol current in the amateur-radio like for example: SMACK, KISS, RS232 - Token-Ring, also SLIP. At fast cards for AX.25, the VANESSA-card is supported with a directly integrated driver. Baycoms and other USCC-modems can be spoken to over external appliance-drivers. To the communication in the local network, for example Ethernet, Token-Ring, FDDI) via AXIP

10.2.1.7 Serial drivers (V.24)

Drivers	PCNET16	PCNET32	NTNET	STNET	LINUXNET	3NET
KISS	X	X	X	X	X	X
SMACK	X	X	X	X	X	X
RMNC-CRC	X	X	X	X	X	X
TOKEN-RING-KISS	X	X	X	X	X	X
SLIP	-	X	X	X	X	X
HighSpeedBus	-	-	-	-	-	X

10.2.1.8 AX.25-Treiber

Hardware	PCNET16	PCNET32	NTNET	STNET	LINUXNET	3NET
VANESSA	X	X	-	-	X	-
TNC3-SCCs	-	-	-	-	-	X
USCC (BAYCOM)	F	F	-	-	X (KISS)	-
OPTOSCC (PA0HZP)	F	F	-	-	X (KISS)	-
HSKSCC (DL3YDN)	F	F	-	-	X (KISS)	-

F = via FlexNet-Driver-Interface

10.2.1.9 AXIP/AXUDP-Driver

These drivers are used for the communication via LANs, IBM-Token-Ring, Ethernet, or Internet/Intranet (AX.25-Tunneling)

	PCNET16	PCNET32	NTNET	STNET	LINUXNET	3NET
AXIP	F	F	-	-	X	X (TNC4E)
AXUDP	F	F	X	-	X	X (TNC4E)

F = via FlexNet-Driver-Interface

10.2.1.10 Additional-programs

Per platform, different background-processes and support-programs are available. With Atari ST and TNC3, these programs are loaded when starting, with all other versions, they are tied in as commands statically.

	PCNET16	PCNET32	NTNET	STNET	LINUXNET	3NET
MONITOR	X	X	X	X	X	X
STATD	-	X	X	X	X	X
CROND	-	X	X	X	X	X
ROUTED	-	X	X	X	X	X
CONVERSD	-	X	X	X	X	X
BEACOND	-	X	X	X	X	X
PFTP	-	X	X	X	X	X
POSTATD	-	X	X	X	X	X
CALLCHKD	-	X	X	X	X	X
XGATE	-	X	X	X	X	X