

# Kofax Communication Server

TC15.EXE Manual

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The logo for Kofax, consisting of the word "KOFAX" in a bold, blue, sans-serif font.

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## Chapter 1

# Preface

There are three Kofax interfaces on which TC15.EXE is used. All these interfaces have a similar architecture. They work with the same processor (SC12) and enable TCOSS to access a Transputer-Link via network.

Interface	Used in	Minimum Exe-Version
TC15	Branchbox MODEL 205 / TC20	TC15.EXE 1.04.16
TS15	Branchbox (TS0D)	TC15.EXE 1.04.19
TC17	MODEL 304	TC15.EXE 1.04.20

Model 304 requires TCOSS 7.38.07 or higher and a server Model 2xx or younger.

The EXE got its name from the first interface it was used on.

TC15.EXE is stored on a silicon-disc inside SC12 and executed by SC12. It is installed at factory site. The Windows GUI-Application tc15Tool.exe is used to configure and diagnose TC15.EXE. TC15.EXE is more Firmware than Software.

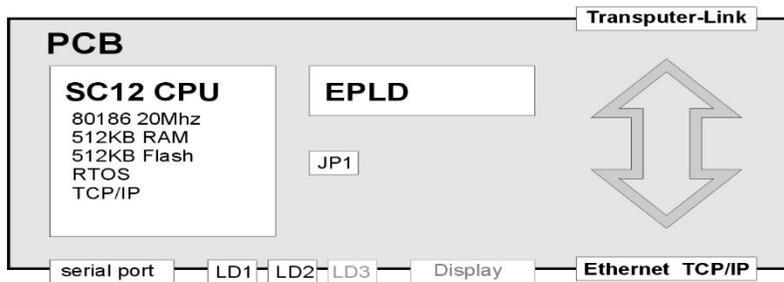
The abstract term 'interface' is often used in this document for one of TC15, TS15 or TC17. TC15.EXE and tc15Tool often uses TC15 in messages, meaning the interface with.

This document describes TC15.EXE 1.04.20. There are some minor differences to previous versions only.

## Chapter 2

# Common Interface Hardware

Out of sight from TC15.EXE the interface hardware looks like:



TC15.EXE is stored and executed on **SC12 CPU**. RTOS (DOS-like), current configuration and some other files are also stored in Flash-Disk of SC12. Interface uses an EPLD for I/O and logic purposes. There are different types/versions of **EPLD** for the different Interfaces.

TC15.EXE listens for incoming TCP connections from TCOSS on the Ethernet-Port. In case of a valid connection (session) data is transparently routed between **Transputer-Link** and **Ethernet**. Ethernet port is a 10BaseT (10 MBps, RJ45) on all interfaces. Transputer-Link speed (10/5 MBps) may be set by hardware-jumper on some interfaces.

The **serial port** (19200,8,N,2, no handshake, hard-coded, DB9-Male on all interfaces) is mainly used to configure TC15.EXE with tc15Tool. It also offers a command-line and trace-outputs for diagnostics purposes. Kofax Production also uses serial port for initial setup (installing BIOS / RTOS etc). Use a standard cross-link cable to connect serial port of interface to a standard PC.

There is a jumper **JP1** on PCB. If this is set no password is needed to configure interface via serial port / tc15Tool. If JP1 is not set the password is required.

Interface TC17 allows connecting a **Display** which allows user to modify IP-Settings and shows some runtime-information.

There are (max.) three LED's on interface. Refer table below to locate LED's on a certain interface. LED states are valid only if TC15.EXE is up. Usually all LED's are on until startup-initialization has finished after a power up / reboot.

**LD1** "Connection" (green) reflects current operation-state of interface. If interface is ready to accept incoming connections from TCOSS, LD1 slowly blinks (1/10 second per second). If interface is used by TCOSS (if there is an active session) LD1 is ON. In case of DHCP-error LD1 blinks alert (together with LD3, 2x 1/10 second per second).

**LD2** "LAN" (red, green or yellow) shows activity on Ethernet port. It usually flickers or is on. If LD2 is permanently off this usually indicates that there is no LAN-cable attached. LD2 is not handled by software; it reflects an output of SC12.

**LD3** "Link" (red or none) shows activity on Transputer-Link. It flickers or is on if there is activity. It is permanently off if not.

**Location of LED's on different interfaces:**

	<b>LD1 - "Connection"</b>	<b>LD2 - "LAN"</b>	<b>LD3 - "Link"</b>
TC15	Slotcover, green/upper	Slotcover, red/center	Slotcover, red/lower
TS15	LAN connector, left/green	LAN connector, right/yellow	PCB, Red LED on top
TC17	LAN1 connector, left/green	LAN1 connector, right/green	Usually N.C. (optional LAN2 left/red)

## Chapter 3

# Principle of Operation

This section describes the principle of operation of TC15.EXE.

## Overview / Main Task

TC15.EXE acts as a TCP-Server on the configured port (5000 by default). It accepts incoming connections on this port at any time (except any strange errors). When a TCP-Client (e.g. TCOSS or tc15Tool) connects an authentication sequence is performed. If authentication fails the corresponding connection is terminated by TC15.EXE and nothing else happens.

If authentication succeeds a 'session' is started. A reset on Transputer-Link is performed (which resets connected interfaces like e.g. TC20). As long as the session stays active data is transparently routed between Transputer-Link and TCP-connection. Because there is only one Transputer-link only a single session can be active at one time.

The session usually is terminated when the connection is closed by the remote host (TCOSS). If there is no special reason against, TC15.EXE forces a reboot and will come up approximately 7 seconds later. (e.g. in case of user-display-interaction on TC17 most reboots are suppressed).

## Authentication

Authentication used is based on CHAP (Challenge Handshake Authentication Protocol).

Server (TC15.EXE) first sends a random challenge-data to client (TCOSS). Client builds a hash (MD4) out of challenge and (hashed) password and sends this hash back to server. Server builds the same hash and compares both. If there is a difference the session is denied and the connection is closed by server.

Challenge and servers answer are extended by some application specific data. Server e.g. additionally transmits a connection-priority (PRI) for the requested session.

If there is no current session, authentication succeeds and a new session is started with the requested priority. This is the most usual case.

If there is already a current session it depends on relation of priorities if authentication succeeds:

current PRI	new PRI	case	Result
0	0	1	Current session stays active
N	less N	2	Current session stays active
N	equal N	3	Current session is terminated, new session is started with new connection

current PRI	new PRI	case	Result
N	greater N	4	Current session is terminated, new session is started with new connection

(PRI is an 8-bit Value (0..255); N (1..255))

Case 1 makes sure that e.g. tc15Tool never disrupts any connection (tc15Tool per default uses 0 to connect).

The Idea of case 3 is: There might be the (very seldom) case that the connection is lost at TCOSS side but not closed at interface side. In such a case TCOSS has to disrupt its own (lost, previous) session.

TCOSS maintains a Session-ID (SID) which is also transferred during authentication. SID is 0 when TCOSS starts up and incremented at each connection attempt.

TC15.EXE also handles other session-types (TYP) than the one used by TCOSS (TYP=0). tc15Tool e.g. uses a special session-type (TYP=3) which e.g. allows remote configuration or uploading files. In any case only one session can be active at a single time.

## Await Connection Timeout

If there is no successful connection attempt (no active session) for a longer period TC15.EXE forces a reboot. The timeout can be configured and is 20 min by default.

## Await Data Timeout

If there is a session active and there is no communication (TCP/LINK) for a longer period TC15.EXE terminates session and forces a reboot. The timeout can be configured and is 10 min by default.

## Typical Use Case Scenario

TC15.EXE is waiting for incoming connection (LD1 blinks). A reboot is forced each 20 minutes until TCOSS successfully connects. A new session starts and stays active (LD1 on) until TCOSS disconnects which forces a reboot.

If a connection attempt with insufficient priority or bad password comes in while there is a session active, nothing happens (except some trace output). If a connection with priority beating the current sessions comes in, the current session is terminated and a new one starts.

## Watchdog

There is a watchdog inside SC12. If TC15.EXE hangs for longer than 25 seconds the watchdog forces a reboot.

## Browsing

TC15.EXE listens for browser requests on UDP-Port 5000 (default). A browser request is a UDP-broadcast which allows locating interfaces in a LAN environment. If a valid browsing request is received by TC15.EXE a browser acknowledge datagram (UDP-Unicast) is sent to the requester. This datagram contains a lot of info, mainly the current IP-Settings of interface. Currently tc15Tool is the only application sending such broadcasts.

Using TC15.EXE in a LAN where other applications extensively broadcast to this port may decrease performance of main-task. You may diagnose such illegal browser-requests by setting a proper trace-level (bit 7)

## Trace Outputs

Trace output is sent to serial port, independent if there is a serial device connected or not. Tc15Tool can be used to record trace outputs to a file.

There is a Tracelevel which is part of configuration. Each bit of Tracelevel enables/disables trace output for a certain theme. Please refer configuration dialog of tc15Tool for available bits/traces.

Per default the traces "session details", "authentication details" and "still alive" are enabled. Please do only change Tracelevel if requested by Kofax Support.

E.g. enabling trace for "TCP-Blocks" or "Link-Blocks" dramatically increases trace output. Heavy trace output may decrease performance and may cause problems configuring interface via serial port. You may type TRACE OFF at the command line to temporarily disable trace outputs.

Most lines in trace have a leading time-stamp based on 'local time' (dd. h:min:sec.sec/100). Because of SC12 has no RTC (real time clock) the local time starts at 0 when TC15.EXE comes up and is increased based on CPU-Clock. When a session is started the local time (h:min.sec) is synchronized with the connecting host. Day (dd) is reset to 0 when a session starts and incremented at each rollover of hours (23=>0).

Some short trace-examples:

```
TC15.EXE 1.04.20
TC17.1A SN 0001
TRACELEVEL 0x0103
MAC: 003056F1CD0C
DHCP: enabled and OK
IP: 172.16.0.7
Netmask: 255.255.255.0
Gateway: 172.16.0.2
Port: 5000
Browser: 5000
```

TC15.EXE has started up in a TC17...

```
0. 00:00:01.14 starting authentication with 172.16.0.123:1253
0. 00:00:01.30 got authentication-response (host="Testserver")
0. 00:00:01.31 ACCEPT-SESSION: 0 (session accepted)
0. 00:00:01.32 => 0. 16:33:34.00 @13
0. 16:33:34.00 new session is:
```

```
0. 16:33:34.01 172.16.0.123:1253 Testserver 2003-12-04 16:33.34 SID=808 TYP=0 PRI=1
TOS=-1 T=0
```

Host Testserver successfully started a session 1.14 seconds after startup. The local time is synchronized with the time at the remote host.

```
0. 16:46:56.74 starting authentication with 172.16.0.32:4529
0. 16:46:56.83 got authentication-response (host="tc15tool@PANO3")
0. 16:46:56.85 DENIE-SESSION: -1 (access denied - wrong password)
0. 16:46:58.77 linger after denie passed
```

Somebody tried a connection (using tc15Tool at host PANO3) but supplied the wrong password – the session is denied because of the bad password...

```
0. 17:00:00.03 still alive
```

TC15.exe is still active...

```
0. 17:01:45.39 starting authentication with 172.16.0.32:4539
0. 17:01:45.55 got authentication-response (host="tc15tool@PANO3")
0. 17:01:45.57 DENIE-SESSION: -2 (access denied - there is another session active)
0. 17:01:47.62 linger after denie passed
```

In the meantime the password seems to be known. The session is denied because the Priority was not high enough to disrupt the current session...

```
0. 17:04:53.07 starting authentication with 172.16.0.32:4540
0. 17:04:53.14 got authentication-response (host="tc15tool@PANO3")
0. 17:04:53.15 ACCEPT-SESSION: 1 (session accepted (while another active))
0. 17:04:53.17 session lost or terminated: (0000 terminate old session: #0)
0. 17:04:53.17 172.16.0.123:1253 Testserver 2003-12-04 16:33.34 SID=808 TYP=0 PRI=1
TOS=-1 T=18791
0. 17:04:53.30 => 0. 16:55:03.00 @18806
0. 16:55:03.01 new session is:
0. 16:55:03.01 172.16.0.32:4540 tc15tool@PANO3 2003-12-04 16:55.03 SID=EBF6 TYP=3
PRI=255 TOS=-1 T=0
```

Now the session is accepted (PRI=255 is the highest possible!). The previous session with Testserver is terminated; a new session with PANO3 is active...

There is a time-gap between Testserver and PANO3 – the time seems to move backward...

```
0. 17:00:00.01 still alive
0. 17:00:50.02 session lost or terminated: (0080 rx-error (CTRL) #258)
0. 17:00:50.02 172.16.0.32:4540 tc15tool@PANO3 2003-12-04 16:55.03 SID=EBF6 TYP=3
PRI=255 TOS=-1 T=3470
0. 17:00:50.05 forcing REBOOT
TC15.EXE 1.04.20
TC17.1A SN 0001
TRACELEVEL 0x0103
MAC: 003056F1CD0C
DHCP: enabled and OK
IP: 172.16.0.7
Netmask: 255.255.255.0
Gateway: 172.16.0.2
Port: 5000
Browser: 5000
```

The remote-host did close connection; the session is terminated – a reboot is forced and TC15.EXE comes up again...

```
TC15> 0. 00:20:00.10 AWAIT CONNECTION-TIMEOUT: will force RESET !
TC15.EXE 1.04.20
TC17.1A SN 0001
TRACELEVEL 0x0103
```

```

MAC:      003056F1CD0C
DHCP:     enabled and OK
IP:       172.16.0.7
Netmask:  255.255.255.0
Gateway:  172.16.0.2
Port:     5000
Browser:  5000

```

Await Connection Timeout occurred. There was no session for longer than 20 minutes. A reboot was forced.

## Command Line

TC15.EXE offers a simple command line interface. It mainly is intended for development, testing, and enhanced diagnostics.

But there are some commands which may be useful. Command line is not case sensitive. Reboots are not suppressed when command line is used. Echo is done by TC15.EXE.

Connect a terminal / tc15Tool and press Enter; the prompt (TC15>) should appear. The most useful command is STATUS. This gives information about current connection, configuration etc.

```

TC15>status
-----
TC15.EXE  1.04.20  (CFG V1.2)
-----
PCB:      TC17.1A SN 0001
CPU:      SN 1CD0C  BIOS 0.72  BSL 2.16
JP1:      REMOVED
TC95:     NONE
-----
MAC:      003056F1CD0C
DHCP:     enabled and OK
IP:       172.16.0.7
Netmask:  255.255.255.0
Gateway:  172.16.0.1
Port:     5000
Browser:  5000
-----
running since 4113 ticks (ca.10Hz)   0. 00:06:51.37
-----
no connection for 4113 ticks (will reboot if more than 12000)
LinkStatus: R- W+
TCPMEM:   6624/92160
-----
TC15>

```

The sample above shows an idle TC17 with no active session. It has booted ca. 7 minutes ago and will reboot in ca. 800 seconds if no session will become active. JP1 is removed.

Linkstatus shows the current status of transputer link out of TC15.EXEs sight:

R means ReadStatus. R+ means that there is data available on link which can be read from exe. R- means that there is no data present on link to be read by exe.

W means WriteStatus. W+ means that TC15.EXE might write data to link; W- means that link is busy and no data can be written from exe to link (device connected to link is busy).

Under normal conditions the link state is R-W+ after reboot. If this is not case this indicates a problem of the device attached to link.

TCPMEM shows the memory balance of the operating systems IP-Stack buffers. 6624/92160 means that there are 6624 bytes in use and max.92160 bytes available. The used buffer size usually increases until enough buffers are allocated. This is OK as long as there is enough buffer memory available.

```
TC15>status
-----
TC15.EXE  1.04.20  (CFG V1.2)
-----
PCB:      TC17.1A SN 0001
CPU:      SN 1CD0C  BIOS 0.72  BSL 2.16
JP1:      REMOVED
TC95:     NONE
-----
MAC:      003056F1CD0C
DHCP:     enabled and OK
IP:       172.16.0.7
Netmask:  255.255.255.0
Gateway:  172.16.0.2
Port:     5000
Browser:  5000
-----
running since 9706 ticks (ca.10Hz)  0. 16:17:43.24
-----
there is a session active:
IP:       172.16.0.123:1246
name:     TCOSSSERVERNT
time:     2003-12-04  16:06.04
SID:      1
PRI:      1
TOS:      -1
active for: 6993 ticks
last RX/TX: 1 (terminate if more than 6000)
LinkStatus: R- W+
TCPMEM:   16392/92160
-----
TC15>
```

The sample above shows a TC17 with an active session. IP shows remote hosts IP-Address and Port (in case of NAT routing this may differ from the IP Address in remote hosts LAN). Name, time, SID, PRI and TOS are parameters received from remote-host during authentication. Name usually is the computer name of the remote host.

The session has started at 16:06 (time at remote host) and is active for 6993 ticks which are ca. 12 minutes. The current time at TC17 (used for trace timestamps, based on the internal tick and session-start time) is 0. 16:17.24.

```
TC15>help
use TC15-TOOL to configure device !
common shell-commands are:
  STATUS,TEST,REBOOT,IPCFG,LOGON,LOGOFF,TRACE,LCR
additional commands available when logged in..
```

you may type HELP to get a reminder of current available commands. If JP1 was removed at boot-time some commands will be available only after LOGON:

```
TC15>logon
please enter password: OK
TC15>
TC15>help
```

```

use TC15-TOOL to configure device !
common shell-commands are:
STATUS, TEST, REBOOT, IPCFG, LOGON, LOGOFF, TRACE, LCR
IP, NETMASK, GATEWAY, DHCP, IPETH
TC15>

```

**Command summary:**

Command	Remark
Status	Shows current runtime information (sample above)
Test	Enters Test-Menu used by Kofax production to perform basic-test. For certain tests special test-adapters might be needed.
Reboot	Forces a reboot
IPCFG	Shows IP configuration (current at boot-time, Is not updated after e.g. IP, IPETH)
LOGON	Is used to enable enhanced commands if JP1 was removed at boot time
LOGOFF	Disabled enhanced commands after LOGON
TRACE OFF	Temporarily disables trace outputs (until reboot or TRACE ON)
TRACE ON	Re-enables trace output after TRACE OFF and shows current trace level
TRACE <hexvalue>	Temporarily sets current trace level to the desired value. E.g. TRACE FFFF enables all traces. Please notice that configuration dialog of tc15Tool shows the current Trace level and not the stored one!
LCR	Allows to manually force a LinkChipReset (very special purpose)
DHCP 0/1 IP <address> NETMASK <address> GATEWAY <address>	Allows to permanently modifying IP settings. Changes are written to file CHIP.INI and will become active after calling IPETH or reboot. It is recommended to use tc15Tool to configure IP-Stack.
IPETH	Reconfigures the Ethernet-Interface / IP-Stack; Makes previous changes current.
.<dos-command>	Passes a dos-command to the operating-system. Most usual DOS commands are available. Be very careful: the interface is permanently unusable after deleting certain files and can restored by Kofax Production only ...
NoWDOG	Temporarily disables WatchDog
Exit	Terminates TC15.EXE without rebooting interface, console is inactive afterwards..

## LEDs

TC15.EXE updates two LEDs to reflect current operation-state. For a detailed description please refer section Common Interface Hardware. The most interesting LED is the green LD1.

State of Green LED LD1	Meaning
ON	There is a session active

<b>State of Green LED LD1</b>	<b>Meaning</b>
Blink (1x 1/10 sec per second)	Ready to accept connection, no session active
Blink (2x 1/10 sec per second)	DHCP failed, no session active; no connection possible

## Chapter 4

# Installation

TC15.EXE and environment is installed at Kofax Production side (procedure described in another document).

Usually there is no need to update TC15.EXE. But there is a possibility to perform an update via LAN described in [Appendix: Testing Network Connection](#).

## Chapter 5

# Configuration

To completely configure an interface using TC15.EXE you must use tc15Tool via serial port. Tc15Tool optionally allows remote configuration via LAN. But this requires an already proper configured IP-Stack at interface-side.

IP-Settings optionally can be modified via command line or via Display on TC17/MODEL 304. Refer the corresponding sections in this document for details.

Most configuration data is stored in a file TC15.CFG on silicon-disc of SC12 which is loaded from TC15.EXE at start-up. IP-Configuration is stored in a file CHIP.INI which is interpreted by operating-system at boot-time.

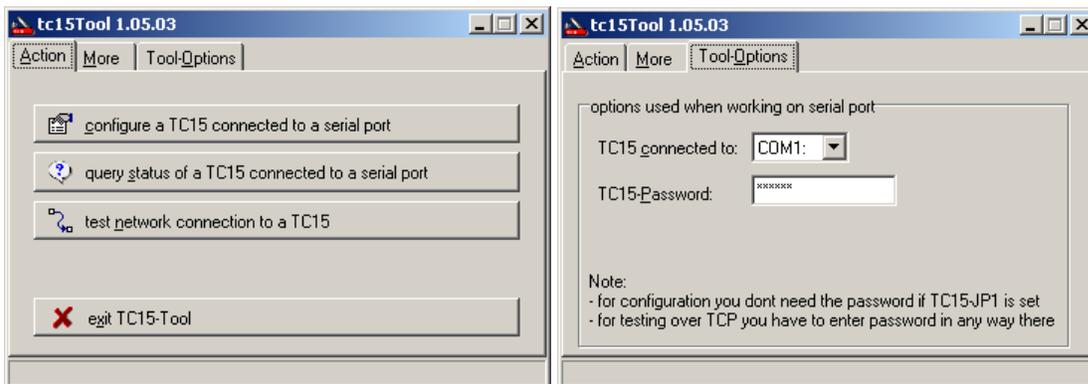
## Configuration via Serial Port

### Requirements

- A PC, e.g. notebook running Windows  
TCP/IP installed, one free serial port, Mouse and VGA min. 800x600 recommended
- Software tc15tool
- A serial cross-link cable (common 9 pin 'link-cable', 'null-modem cable', like used to link PC's)

### Procedure

Use cross-link cable to connect interface to PC and start tc15tool:

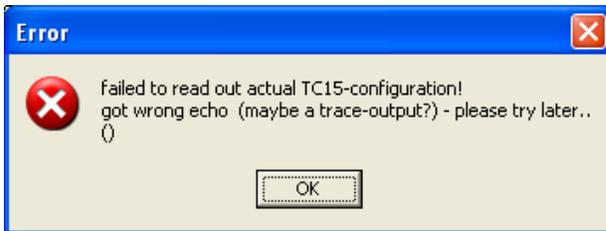


Make sure that COM-Port selected in TAB Tool-Options is the one interface is connected to. Enter Password or set JP1 to disable the need of password. Factory-default password is TCTECH. You should change this in any case.

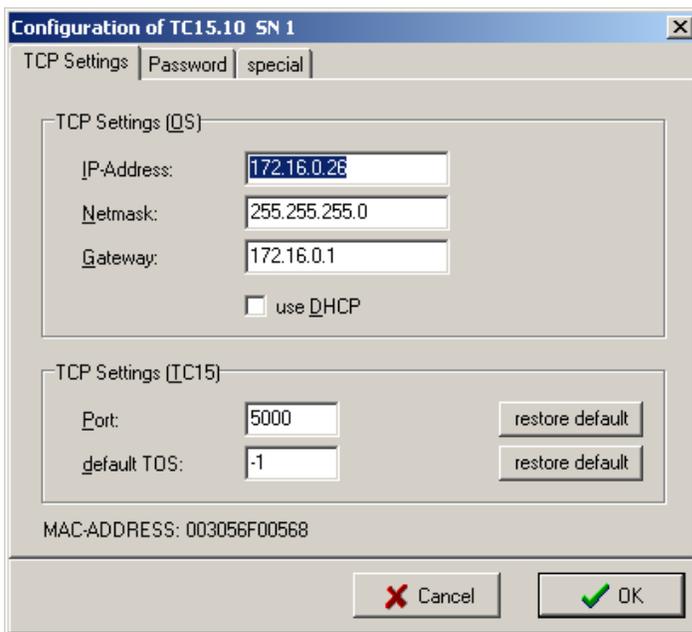
Power up interface; after a few seconds green LED LD1 must periodically blink approx. 1/10th of a second indicating that interface is idle.

Press button 'configure TC15 connected to a serial port' and enter settings.

There might be the case that trace-output disturbs communication (especially with higher trace-levels) and an error-message pops up:



If retry does not help the trace-outputs has to be stopped. The easiest way is to disconnect LAN-cable. Alternatively trace can be stopped by entering TRACE OFF at command line.



**IP-Address, Netmask and Gateway** have to be set according the situation of the LAN in which interface is installed. Contact customers LAN administrator for proper values.

Alternatively **DHCP** can be used to retrieve this information from a DHCP server at each start-up. Please keep in mind that TCOSS must be able to connect to interface at any time. So either provide a static IP-address (recommended) or make sure that DHCP and DNS settings allows TCOSS to find out IP address of interface. For configuring DHCP server you might need the MAC address. It is noted on the checklist or can be seen in tc15tool during configuration. IP-Configuration does not support a hostname or DNS. There is no support for dynamic update of DNS entry.

If DHCP fails at start-up TC15.EXE will retry to obtain a lease each 10 minutes

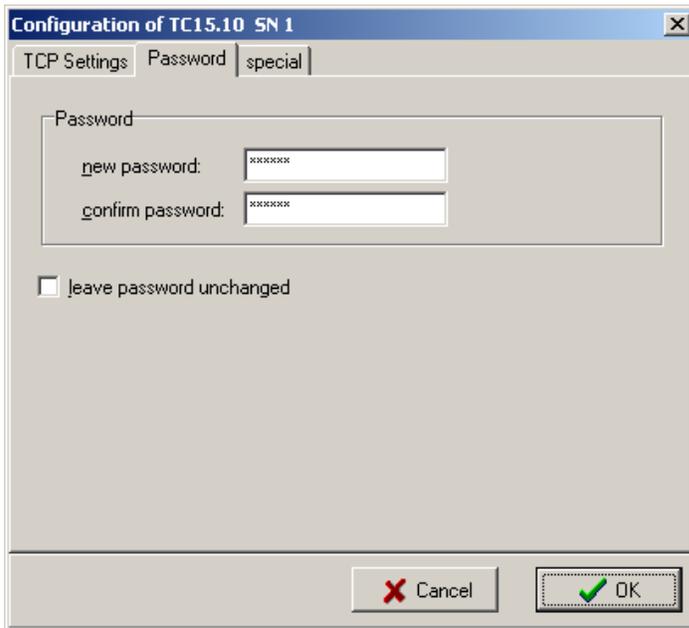
**Port** is the TCP port on which TC15.EXE acts as a server and where TCOSS connects to as a client. Apply default settings if there are no special requirements.

**Default TOS** is the value for the TOS octet (Type Of Service, RFC1349, RFC2474) inside outgoing IP packets. Some routers use this value to manage Quality Of Service (load balancing, transmission priority). A value of -1 (default) means to take systems default.

During authentication TCOSS provides a TOS value to TC15.EXE too (configured on TCOSS site). The value for 'Default TOS' you enter here is used during authentication only and will be overridden by the value supplied by TCOSS. If TCOSS supplies a value of -1 (which means default) TOS will not be changed by TC15 so that value 'Default TOS' is valid for whole the session.

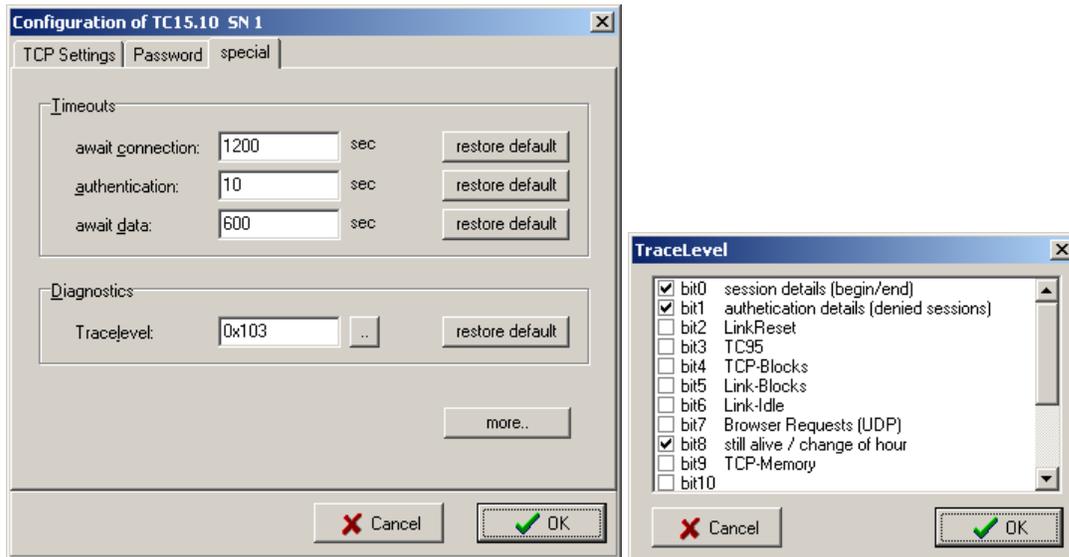
If special values make sense, this has to be coordinated with customers LAN administrator (who might has to correspond documentation of network equipment) and can be tested with tcpMeter.

It is true that TC15.EXE requests the desired TOS Value from IP-Stack (which is a part of OS) but as far as discovered this value is not really used in outgoing packets. The same is true for TCOSS / NT-Side...



**Password** is used during authentication (which means the procedure that makes sure that a connecting client is authorized to use interface) and to protect interface against unauthorized configuration attempts. Please don't forget password - you will have to provide it to TCOSS as one of the connection parameters.

On interface side the only restriction is that password must not be blank. The password is case sensitive!



TC15 handles some **timeouts** which can be changed in tabbed sheet special:

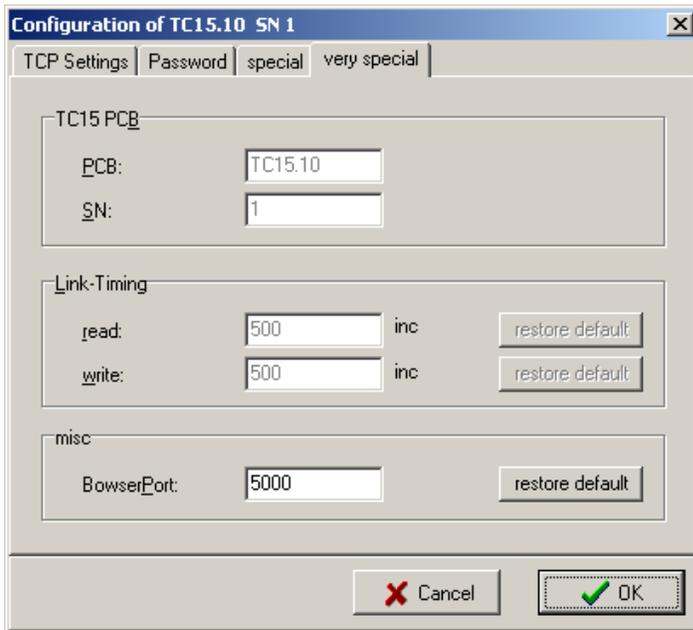
If there was no session active for more than **await connection** seconds, then TC15.EXE will force a reboot (e.g. to force a DHCP Request and re-initialization). Example above means that interface reboots once each 20min. if idle.

The value of **authentication** means how many seconds TC15.EXE awaits the authentication response after sending the challenge to a fresh connected client. Only one authentication is done at a time so that interface is blocked for incoming connections as long as busy for authentication. Authentication is done in background so that normal operation / an already active session is not disturbed. Example above means that if one connects to interface using telnet it needs ten seconds until TC15.EXE terminates connection and is ready for new connections.

If there is a session active (which e.g. means TCROSS has successfully passed authentication and is sending/receiving data to/from Transputer-link) and there is no traffic for longer than **await data** seconds, this session will be terminated. This e.g. could happen in case of fatal network errors (e.g. broken line).

Value of **Tracelevel** tells TC15.EXE what runtime information should be output to the console (serial port). Trace outputs can be viewed with a simple terminal (19200,8,2,N, no handshake) or with tc15tool. tc15tool additionally offers a feature to record trace outputs to a file. A value of 0x103 is recommended for normal operation. Apply higher values for special purposes only.

With button **more** you will reach the following read-only page.

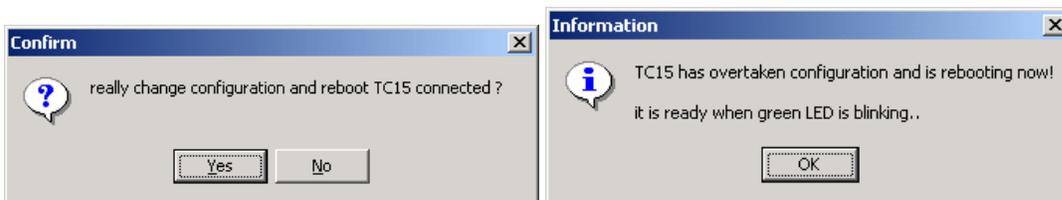


**PCB** and **SN** (read only) are revision and serial-number of TC15 printed circuit board.

**Link Timing** are counter values, used internally for block detection on link.

TC15.EXE is listening at **Browser Port** (UDP) or incoming browser requests (default port 5000 is used by tc15tool) A value of 0 generally disables the browsing option.

Press OK to apply settings and confirm with YES inside the message box appearing. In case of success you will get an adequate message and interface will reboot.



## Configuration via LAN

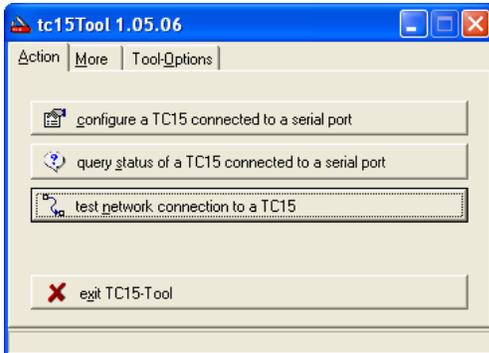
Configuration via LAN is optional. Configuration via serial port is preferred. It works in certain cases only (IP-Connection must be possible) and involves a certain risk. If e.g. IP-Settings are changed in a way the new settings will not allow consecutive connections there is no way back via LAN...

For reliability Await-Data Timeout is also used for connections between tc15Tool and TC15.EXE. Session is aborted by TC15.EXE if there is no communication for longer than 10 minutes (by default). This means that one must not need longer to successfully configure interface via LAN.

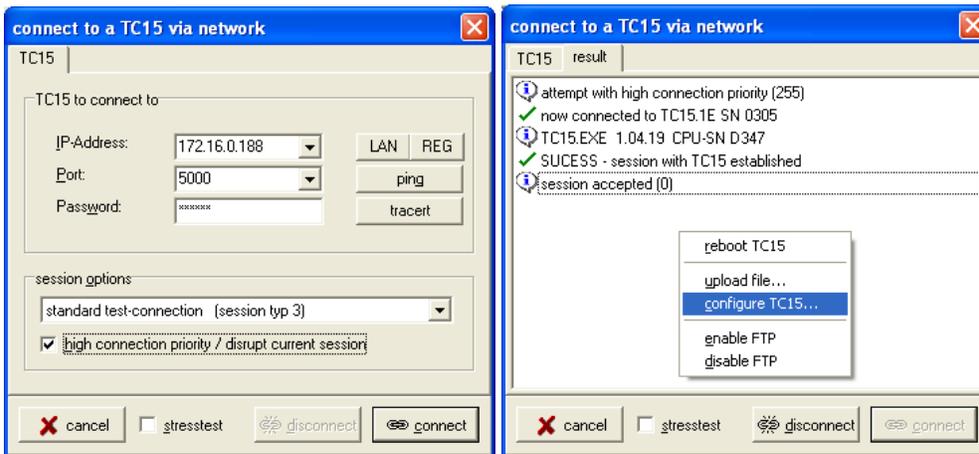
**Requirements**

- A PC, e.g. notebook running Windows  
TCP/IP installed, one free serial port, Mouse and VGA min. 800x600 recommended
- Software tc15tool
- LAN connection to interface must be possible

**Procedure**

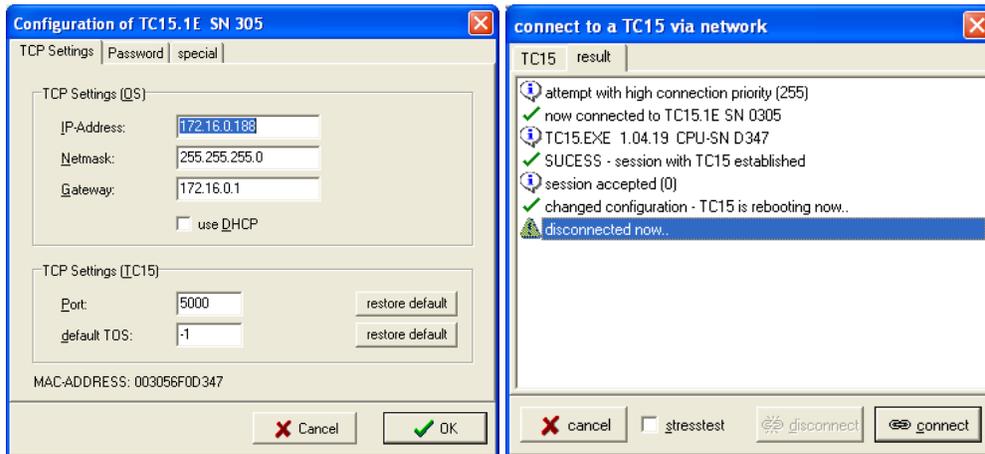


In tc15tool press 'test network connection to a TC15'...



Enter **IP-Address** and **Password**. Check 'high connection priority' to make sure that no other Client (e.g. TCROSS) can disrupt the new session and press 'connect'. After session accepted choose 'configure TC15...' in context menu (right mouse button).

The configuration dialog appears. It is the same dialog as described for configuration via serial port. Make changes and press OK to accept. That it was...



## Configuration via Command Line

IP Settings (only) may also be changed at command-line. Please also refer the command-line section above. Commands of interest are IPCFG, DHCP IP, NETMASK, GATEWAY, IPETH and REBOOT. Either JP1 must have been set at boot-time or LOGIN is required.

### Sample:

```
TC15>IPCFG
IP      =172.16.0.23
Netmask=255.255.255.0
Gateway=172.16.0.2
DHCP    =1
MAC= 00 30 56 F1 CD 0C
TC15>DHCP 0
TC15>IP 192.168.137.123
TC15>NETMASK 255.255.255.0
TC15>GATEWAY 192.168.137.1
TC15>REBOOT
.....
```

## Configuration via Display (TC17 Only)

Display menu of TC17 allows modification of IP settings (only). Please refer corresponding chapter below about details of procedure.

## Chapter 6

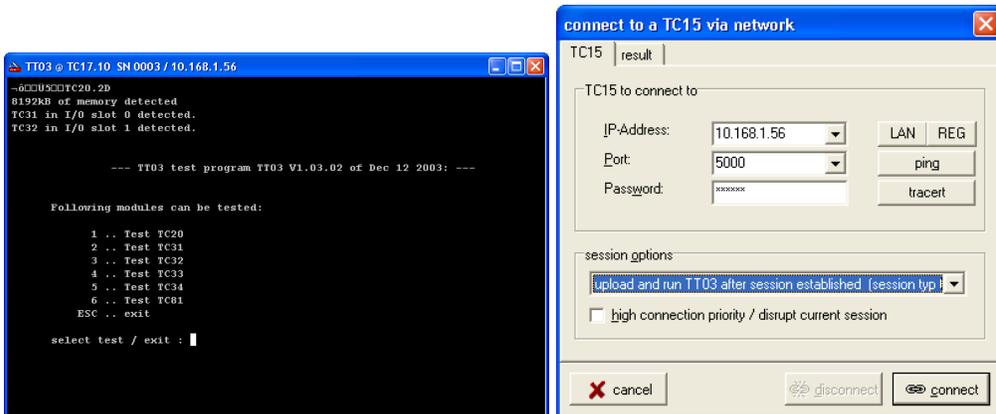
# Diagnostics

Depending on topic of interest there are some places to start diagnostics:

- tc15Tool allow to test if IP Connection works e.g. from TCOSS-Side to interface. Refer to [Appendix: Testing Network Connection](#) for details.
- Serial port gives out diagnostics information depending on Tracelevel. Trace-output can be recorded into a file using tc15Tool. Trace mainly output shows session details. When did who connect for how long? Refer chapter [Trace Outputs](#).
- There are some very basic hardware tests (LED's, Display etc) available at command line (test). These tests are intended for Kofax Production Department. Some requires special test adapter.
- There is a tool 'tcpMeter' to verify stability and throughput between head- and branch-offices (WAN). tcpMeter is described in a separate document. It does not communicate with interface but uses connection like an interface.
- tc15Tool (1.05.06 and later) allows to run test-program TT03 via LAN on an remotely connected interface (e.g. TC20 connected to TC15 or TC30/TC17)

TT03 Testing Instructions:

- Set the jumpers of TC31/TC32 according to test instructions
- Mount TC31/TC32 onto TC30 as described above
- Start TC15Tool.exe and select 'test network connection to a TC15'
- Provide TC15/TC17 IP address, port number, and password as usual
- from 'session options' select 'upload and run TT03 after session established (session typ 0)'. TT03 is loaded to TC20/TC17.
- Make the applicable tests (run '2' if you have TC31, run '3' if you have TC32). The TT03 tests run as usual with TC20. There must not be any error message during testing. Refer to TT03 documentation for test details.



## Chapter 7

# Version History

Please notice that beside TC15.EXE itself there are some corresponding data/files installed on the silicon disc of SC12 (SC12-BIOS, CHIP.INI, AUTOEXEC.BAT, HELPER.EXE, TC15.CFG, ECHO.BTL). A 'version' also includes these files (but they usually are identical for different versions of TC15.EXE).

### **TC15.EXE 1.04.16 February 2001**

Very first published release; Requires BIOS 0.72; Works on TC15.10 with EPLD 1.3.

### **TC15.EXE 1.04.17 March 2001**

Gives out a warning if mainloop-time exceeds 1 second (what normally should not happen)

### **TC15.EXE 1.04.18 April 2001**

If Link-Write blocks for longer than 10 seconds a LinkChipReset is performed to reset EPLD.

### **TC15.EXE 1.04.19 April 2002**

Very first version supporting TS15; added delay of 200 msec after performing a LINK\_RESET to allow TS0D to get ready

### **TC15.EXE 1.04.20 January 2004**

very first version supporting TC17 (Display, specific TC17-tests etc.);

changed LED-Blinking for DHCP-Fail because of invisible LD3 on TS15/TC17

added file ECHO.BTL for link-test on TC17

### **TC15.EXE 1.04.21 March 2004**

Fixes error 'strange behavior when modifying IP-Settings via TC17 Display'

### **TC15.EXE 1.04.22 March 2004**

Fixes error 'chaotic display output after modification of IP-Settings'

### **TC15.EXE 1.05.06 February 2005**

Requires latest BIOS 1.10 which should fix possible IP-problems

## Chapter 8

# TC17 – Display

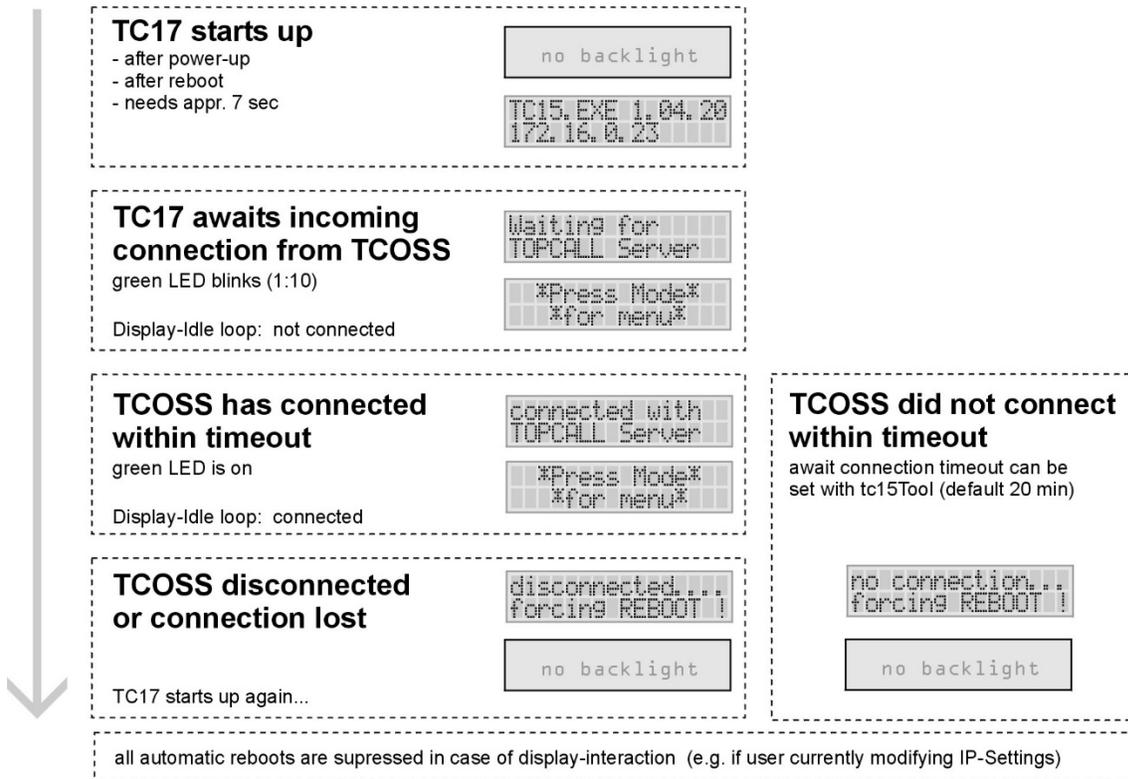
This section describes the display of TC17.

## Common

TC17 is equipped with an LCD Dot Matrix Display (2 lines / 16 char). This gives some diagnostic information and allows modifying IP-Settings. There are two buttons to navigate in display-menu: MODE and SET. As long as there are no buttons pressed display runs in an Idle loop. Navigation in Menu does not interfere with normal TC17 operation (which e.g. means that TCOSS is not disturbed using TC17) except the following cases.

requested reboot	Of course TCOSS will be disconnected if a reboot is forced via display menu...
Await connection timeout	If there is no incoming connection for a longer time TC17 usually reboots. In case of display-interaction this reboot is omitted / delayed by 30 seconds.
Disconnection / Session End	Normally TC17 reboots if TCOSS disconnects; If display interaction is in progress this reboot is omitted. Consecutive connections will still be accepted as usual
Change of IP-Settings	If there is any change in IP Settings the current connection will be closed

### Display messages during a typical Uptime-Cycle



### Special Messages in Display-Idle loop

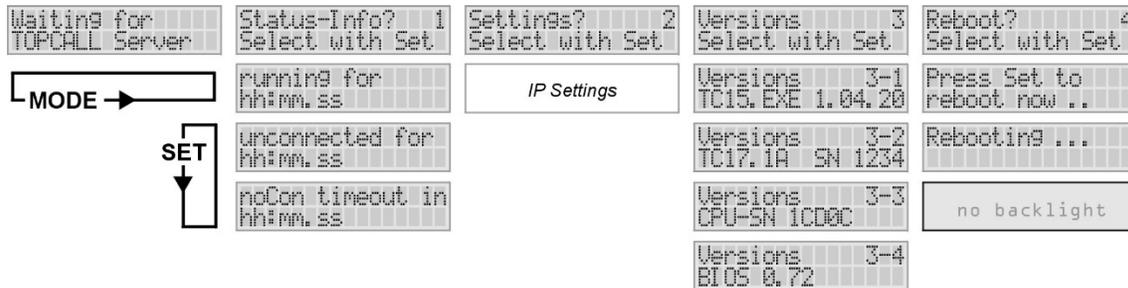
There are some special cases which are reflected on display.

<pre>DHCP failed! not ready..</pre>	<p>DHCP failed, it will be retried each 10 minutes TC17 is not reachable via LAN at the latest await connection timeout will force reboot</p>
<pre>IP-ACCESS DENIED WRONG PASSWORD !  IP-ACCESS DENIED ILLEGAL ATTEMPT?  IP-ACCESS DENIED BAD PARAMETERS !</pre>	<p>there was an attempt to connect, but authentication failed: - the password may be wrongly configured at TCOSS side - a non-Kofax application may have tried to connect</p>
<pre>IP-ACCESS DENIED ALREADY IN USE !</pre>	<p>TCOSS (or tc15Tool) tried to connected while there is already a session active. password was valid, but priority of caller is not high enough to cancel current session</p>

These messages only may appear in Display-Idle loop (when no button is pressed) and typical disappear after one minute.

## Display Menu

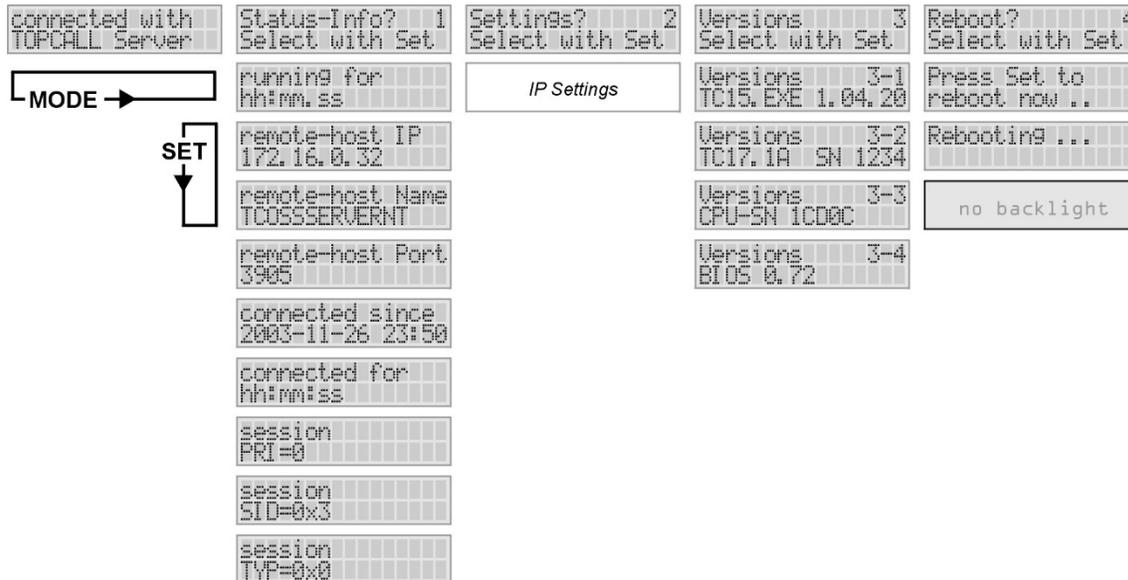
Menu is entered by pressing the MODE button while display is in Idle loop. In all figures below MODE moves right, while SET moves down.



Status-Info depends on connection state. If there is no connection Status-Info shows the time since TC15.EXE is running (running for), the time for which there is no connection (unconnected for) and the time which remains till 'await connection timeout' appears (noCon timeout in).

Please keep in mind that automatic reboots are suppressed when display interaction is in progress. This is also true for watching status and 'await connection timeout'-reboot. The 'await connection timeout' is delayed by 30 seconds in case of display interaction, so that you will never see a value less 30 seconds there...

If there is an active connection Status-Info shows some details about this:



remote-host IP	The IP-Address of the connected host (TCOSS-Server), which is used for communication. In case of NAT-Routing this may differ to the IP-Address in remote hosts LAN.
----------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

remote-host Name	The computer-name of the TCOSS Server, passed from TCOSS to TC17 during authentication (not a name resolved via DNS, Interface do not use any DNS)
remote-host Port	The TCP-Port used from TCOSS to communicate with Interface
connected since	The time (yyyy-mm-dd hh:mm) at which TCOSS connected to Interface. (passed from TCOSS to TC17 during authentication; There is no RTC in Interface)
Connected for	The duration of the current session/connection (counted using internal TICK)
Session PRI	The current sessions Priority (can be set at TCOSS-Side); Depending on priorities relation a new connection attempt may disrupt current session or may not.
Session SID	The ID of the current session (Session-ID). Current Versions of TCOSS simply counts up SID at each connection attempt to a single Interface (beginning at 0 at start-up of TCOSS). A SID of 3 means that the current connection is the third one since TCOSS started up – there were 2 connections lost!
Session TYP	The Type of the current session. TYP=0 (link-usage-session) is used by TCOSS. TYP=3 (control-session) is used by tc15Tool.

If more information is required please use tc15Tool or a serial-terminal.

## IP Settings

### Overview

The Settings-Menu allows modifying DHCP, IP-Address, Netmask and Gateway. Port and MAC-Address are displayed only and cannot be changed via display menu.

If there is a session active modification of any IP-Setting will aborts this. After modification of all desired IP-Settings it is recommended to reboot TC17 and to check if settings were valid and accepted. It is not necessary to reboot after modifying each single setting. Depending on the type of change (especial when enabling DHCP) a reboot may happen after confirming the settings.

Each time a single IP setting is modified the whole IP-Stack is reinitialized to apply whole the desired configuration. When an IP-Setting is not applicable it becomes 1.1.1.1. This is especially true for Gateway which must be within local subnet. Trying to set Gateway out of local subnet will result in a Gateway 1.1.1.1.

On the other hand this means that a bad modification of Netmask can invalidate Gateway. (Sample: before Modification IP-Address: 10.1.2.3 Netmask: 255.0.0.0 Gateway: 10.0.0.1. Then a change of Netmask to 255.255.255.0 will invalidate Gateway).

Therefore IP Settings should be changed in the menus order (IP-Address, Netmask, Gateway).

When DHCP is enabled IP Address, Netmask and Gateway cannot be edited because they are/will be assigned by DHCP. To manually set these setting DHCP has to be disabled:



Only if DHCP is disabled IP-Address, Netmask, and Gateway can be modified:



IP-Address, Netmask and Gateway have the same format. Editing those works in the same way. To enter edit mode press SET when the desired setting is displayed.

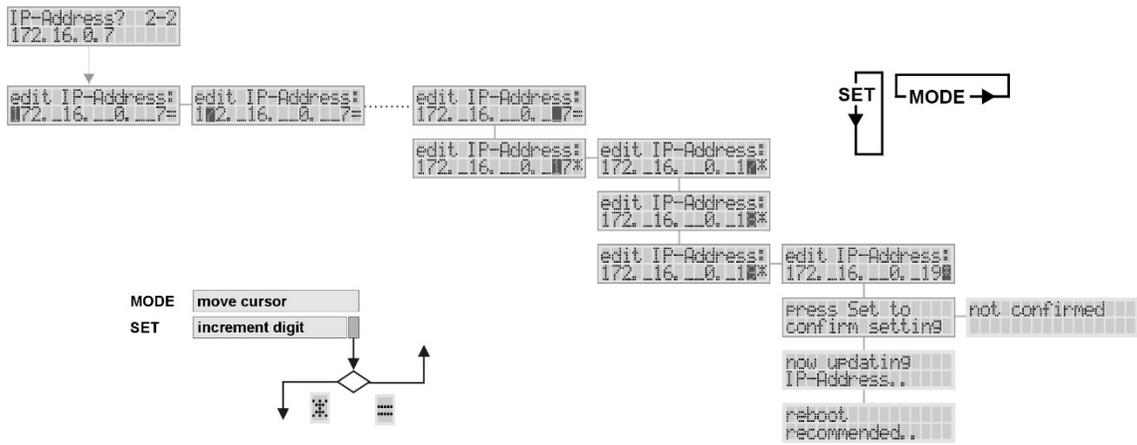
Editing happens in the lower display line, showing the current value, a 'change-indicator' and a cursor. If the current value is not modified (is equal to the active setting) the most right digit shows an equal sign (=). If the current value has changed the most right digit shows an asterisk (\*).

The cursor is moved by the **MODE** key. Each time MODE is pressed the cursor moves on step right. Pressing MODE at the end of the line moves the cursor back to the first digit of the line.

Behavior of **SET** depends on current cursor position. If cursor points to any digit of the IP-string SET increments this digit by one (12...901...).

Pressing SET at the most right position (change indicator) leaves edit mode. If the value has been changed (\*) a conformation is requested. After confirmation it takes a few seconds before the change becomes active. In this time the display shows 'now updating'. After a successful change the display shows 'reboot recommended' for a few seconds.

The sample below shows how to change IP-Address form 172.16.0.7 to 172.16.0.19



## Chapter 9

# Hints

This section provides additional hints for using TC15.EXE.

## Moving SC12 from One Interface to Another

Please notice that the PCB identification is part of the TC15.EXE configuration stored in TC15.CFG on silicon disc of SC12 (and set with tc15Tool during production). When SC12 is moved from one interface to another the PCB configured is wrong.

If the type of the target interface is the same as the source interface this is ugly only. If types of interfaces differs this may cause malfunctions.

TC15.EXE uses PCB identification to decide which type of interface it is running in and which pieces of hardware have to be handled. E.g. a TC17 has a display, a TS15 does not...

## Find Out Version of TC15.EXE

There are a lot of possibilities to find out the version of a TC15.EXE running in an interface:

- At command-line version can be requested using the status-command and is shown at startup.
- Tc15Tool shows version when performing network connection test (also if password is wrong)
- Tc15Tool also shows version when browsing LAN for interfaces (test network connection, button LAN)
- On a TC17 the version is displayed at startup and can be seen in the displays Versions Menu

To find out version of a TC15.EXE file this also can be executed in a windows command-shell. In such a case exe recognizes that it is not running on a SC12 simply writes out version and terminates.

## IP Settings (Gateway 1.1.1.1)

When IP-Settings are modified (via tc15Tool, TC17-Display or command-line) only the principle format of the settings are checked. But there is no check if e.g. Gateway corresponds to IP-Address and Subnet-Mask. So it is possible to enter wrong settings e.g. that Gateway is out of local Subnet. In such a case the Gateway becomes 1.1.1.1 after applying settings to show that there is something wrong.

## Remote Host IP

There are a lot of situations where TC15.EXE gives out the remote host IP (the IP Address of the TCP-Client connected, IP Address of TCOSS Server).

Please notice that the IP address shown is the one really used for communication (in the interfaces subnet). Especial when NAT Routing (Masquerading) is used at the remote hosts' side the IP address displayed differs from the IP address of the remote host in his subnet. In such a case the displayed IP address then is the one of the Router. Most Firewalls are using NAT routing.

## Known Errors and Restrictions

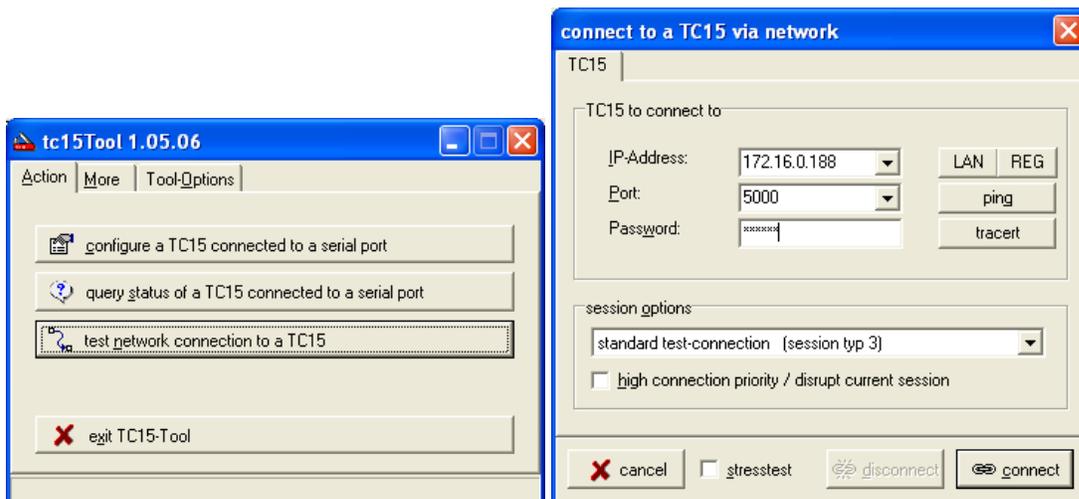
Some features of TC15.EXE use only 16 bit (4 hex digits) of the SC12-CPU-number (which is 5 hex digits since 2003). When browsing LAN using TC15Tool only the lower 16 bits of CPU-Number are displayed. Interface TC15 has a hardware connector to TC95/96. The timing of the I<sup>2</sup>C bus (determined from SC12 BIOS) does not work with TC95/96.

## Chapter 10

# Appendix: Testing Network Connection

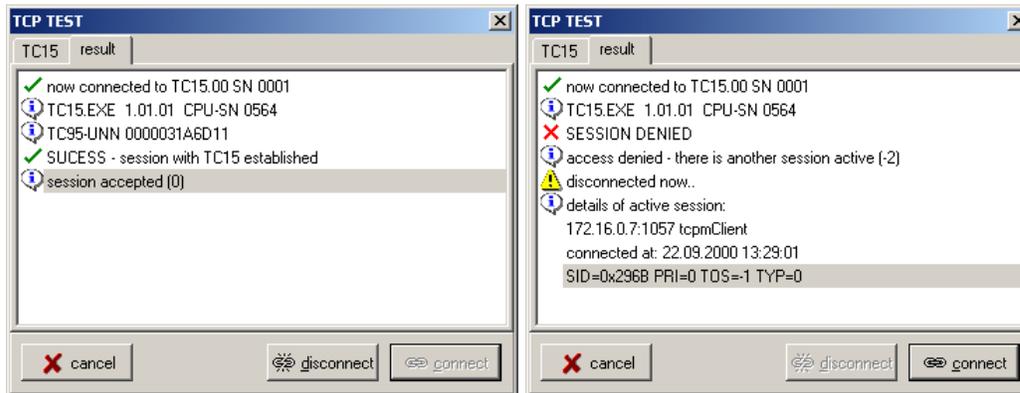
In case of troubles or to validate connection parameters tc15tool can be used to test network connection to interface.

Start tc15tool on the machine where you want to connect from (typically TCOSS server) and press button **test network connection to a TC15** (TC15 herein used for all interfaces using TC15.EXE). A dialog appears where you have to enter the connection parameters:



You can use button LAN to browse TC15 in a LAN (not in a WAN, browsing is using UDP-broadcasts; you might have to modify tc15Tool.ini on multi-homed hosts to get it work). On a TCOSS server you can use button REG to browse local registry for a TC15 configured there.

Enter the desired values and click **connect**. tc15tool tries to establish a session with interface. The result of this attempt is shown in a list on page result. If connection parameters are valid the result looks like:



The left screen shot shows the case of an idle TC15. A session could be established and will be active until await data timeout occurs, a new connection with higher priority is accepted by TC15 or button disconnect is pressed.

The right screen shot shows the case of busy TC15. There already is a session active and priority of connection attempt from tc15tool is not high enough to terminate the active session.

Per default connection priority of tc15tool is 0, which is the lowest possible priority so that tc15tool usually will not terminate any active session. You may use checkbox **high connection priority** (context-menu in former versions) to force tc15Tool to use a priority of 255 when requesting a new session.

#### Info:

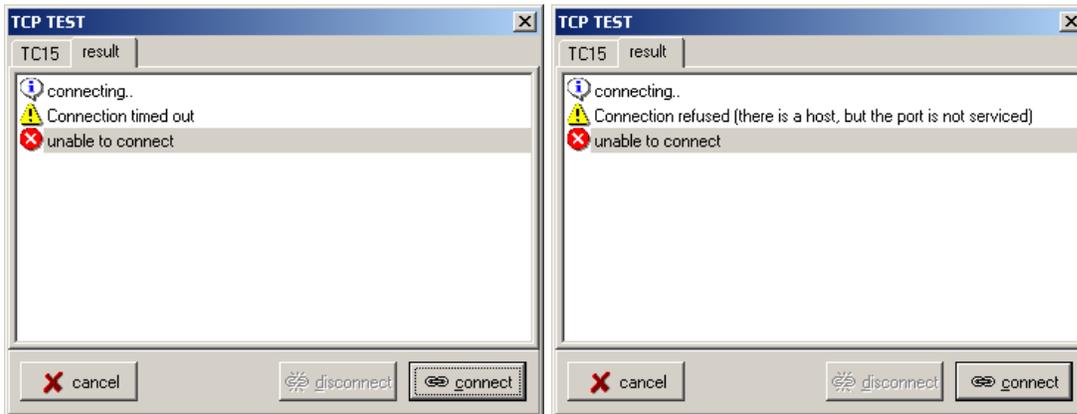
The shown IP-address is the one that TCOSS used to connect to the TC15 – that is not necessarily the one that is configured on the TCOSS Server! Since the connection to the TC15/BranchBox is external and the 'real IP-address' of the TCOSS server is an internal 10.\* there has to be a public IP address where the BranchBox can communicate with the TCOSS server (masquerading, NAT-Routing) - and that one is shown!

Some aspects of that technique:

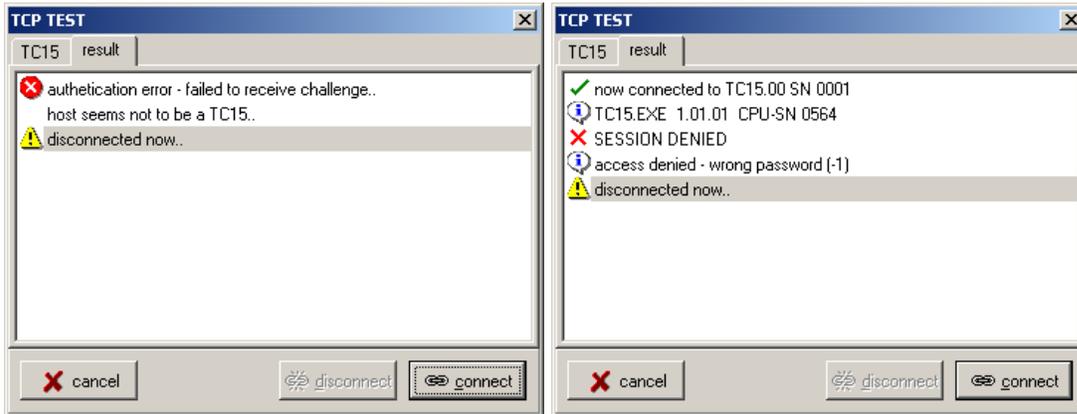
- From external view every local host seems to have the IP-address of the NAT-router (providing NAT/masquerading is used)
- Connections can only be initialized from local to public, not other way round - for security reasons.
- Public IP-addresses (rare and expensive) are saved.

If you see any other result there might be problems with the network or the settings you provided. Below you can see some typical error conditions:

E.g. no (reachable) host at this IP-Address



E.g. wrong IP-Address / Port e.g. wrong password, Address and Port OK



In case of connection troubles try buttons PING and TRACERT first. If nothing helps, you have to contact LAN administrator for supporting you.

## Chapter 11

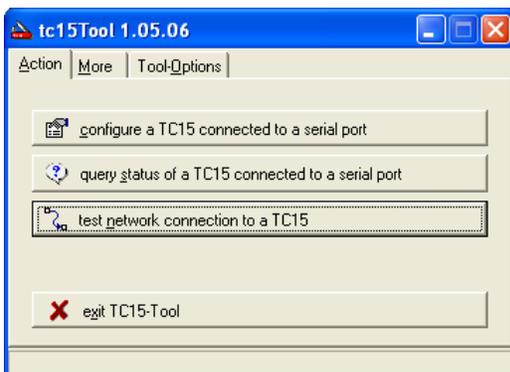
# Appendix: How to Update TC15.EXE via LAN

TC15.EXE has a feature which allows remote-update of software via LAN using TC15 Tool.

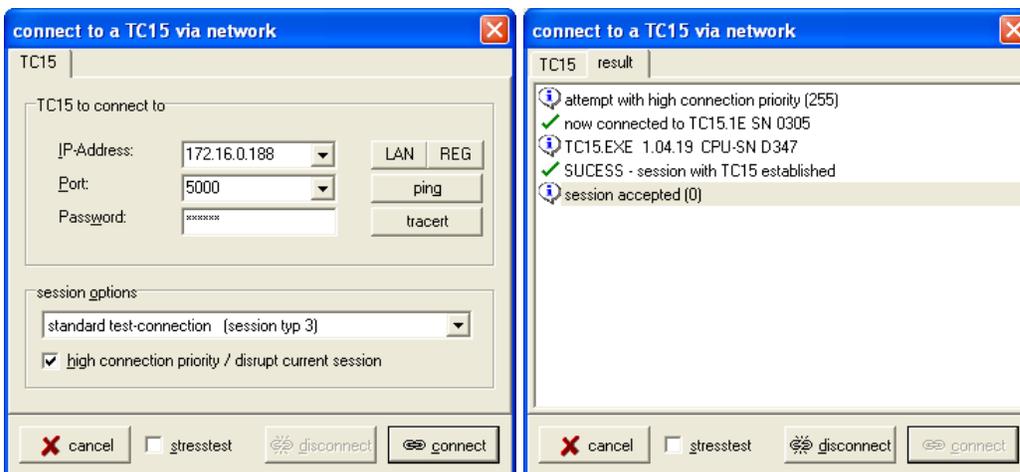
### Requirements:

- New file TC15.EXE, where you want to update to
- TC15 Tool 1.05.04 or later (1.05.06 used in here)
- TC15.EXE 1.04.10 or later running on interface (TC15/TS15/TC17)
- Knowledge of current interface configuration (IP-Address, Port, Password)
- Network-Connection to interface

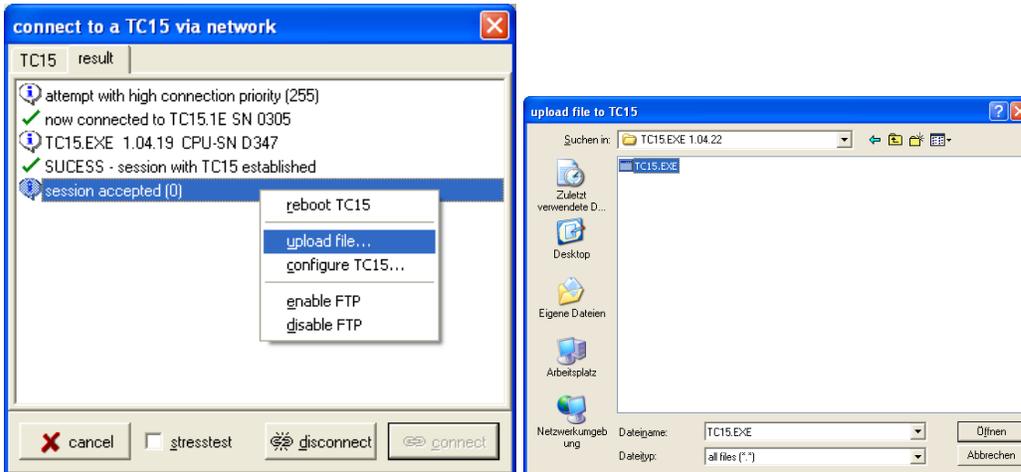
### Procedure:



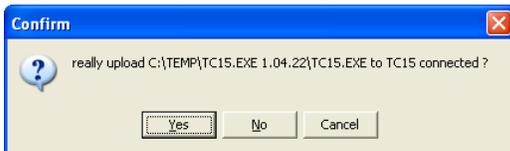
Start TC15 Tool and press **test network connection to a TC15**



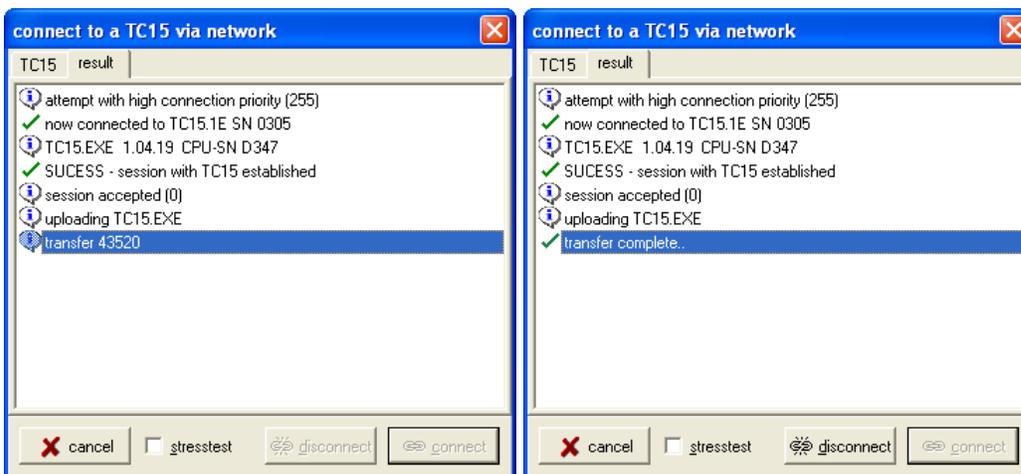
Enter connection-info of TC15, check **high connection priority** and click connect; Session must be accepted. Notice: current version of TC15.EXE is 1.04.19



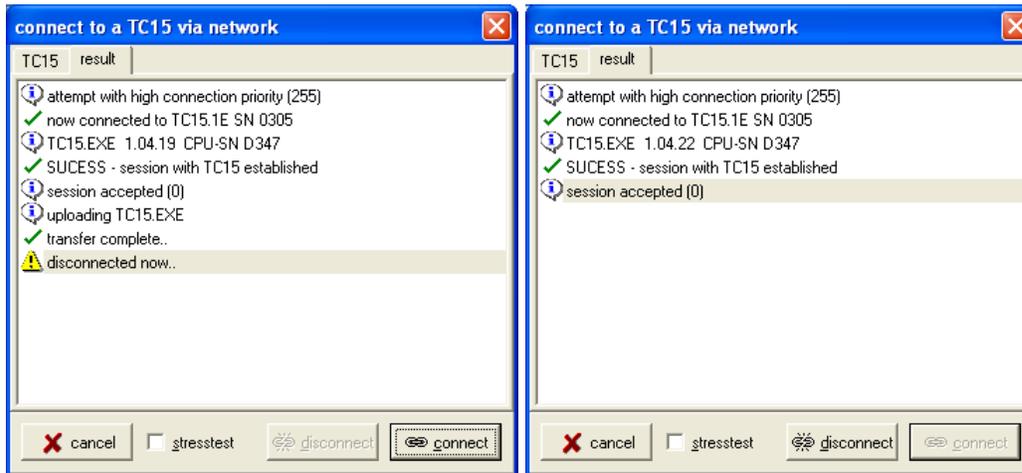
Choose context-menu item **upload file** and select new version of TC15.EXE.



Press **YES** to confirm upload..



..and wait until **transfer complete** message appears; Click disconnect to end session and force a reboot of interface..



Wait a few seconds and click **connect** again. Current **version** of TC15.EXE now is 1.04.22; The Upload succeeded.

Disconnect again to allow TCOSS to connect...

**Hints:**

TC15.EXE is designed to run on interface. But you might also start it under Windows and will see the version of the EXE.

Internal procedure of update is as safe as possible; there is no problem for TC15 if connection breaks during transfer.

Software update will take approximately one minute in a LAN / five minutes in a WAN.