System-Blade Installation Guide

(TB640-E1/T1/J1, TB640-DS3, TB640-OC3/STM-1, TB-16- E1/T1/J1, TB-8-E1/T1/J1, TB-Multi-Blade, TB-Video)

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HEAD OFFICE
115-A1 De Vaudreuil,
Boucherville, Quebec,
Canada, J4B 1K7
T +1 450 655 8993
F +1 450 655 9511
info@telcobridges.com
support@telcobridges.com

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1. System requirements

To install this package, you will need access to the following system components:

1.1. Equipment required:

- **TelcoB**ridges system-blade with its rear panel I/O
- TB-Multi-Blade with its rear panel I/O (optional)
- Null modem DB-9 serial cable to connect the **TelcoB**ridgesB serial port (on the rear panel I/O) to the Windows system serial port (lines 2 and 3 needs to be crossed). This is required only for IP address configuration
- Two Ethernet connections (1Gbps) to the system- blade (RJ-45 connector). This must be connected on a local area network only (**Important Note:** Do not connect to the WAN)
- Two Gigabit switch for control redundancy
- CompactPCI chassis
- Control system (Host)

Note Different hardware may require different cables, please check the specific hardware section to ensure you have all the correct components for hardware installation

1.2. Gigabit Ethernet switches

Two gigabit Ethernet switches must be used to support full control redundancy. Up to now, we have not encountered any problems with any kind of switches on the market. Here are some models we use in our lab for testing:

- Dell Powerconnect 2708, 8 gigabit Ethernet ports
- Dell Powerconnect 2716, 16 gigabit Ethernet ports
- Netgear GSM7324, Layer 3 managed, 24 gigabit Ethernet ports

1.3. CompactPCI chassis

CompactPCI chassis must provide adequate power and ventilation to the system. Here are the requirements:

- 33Mhz/32 bits or 33MHz/64 bits PCI bus
  - The PCI bus is not used for data transfer, however the system-blades must be compatible with its clocking frequency.

    Important Note 66Mhz buses are not supported
- H.110 bus
  - This is required if more than one system-blade in the CompactPCI chassis must be connected together
  - If the TB-Multi-Blade architecture is used, in most cases the H.110 bus is not needed
- CompactPCI CPU board is not required (see section 1.4).
- Currently only three CompactPCI vendors satisfy the power requirements, the airflow and the high availability features:
  a. Rittal (www.Kaparel.com)
     a. **TelcoB**ridges P/N
        i. TB7020-5-001, 2U, 2x250W AC power supplies
        ii. TB7040-5-002, 4U, 3x250W AC powers supplies
        iii. TB6101-015, 10U, 5x250W AC power supplies
        iv. TB6101-017, 10U, 3x500W DC power supplies
     i. Excellent power management and distribution

ii. Excellent airflow
iii. Hot-inserting a power supply may cause a sudden drop in power

b. Continuous Computing (www.ccpu.com)
   a. P/N
      i. Flex21, 13U , Redundant DC power supplies, 75W per slot
   i. Separate power supply for each slot
   ii. Excellent power management and distribution, one power module per slot
   iii. IPMI controller, can control fans and power supplies
   iv. Excellent airflow with temperature sensors on each slot
   v. Now supports 1Gbps PICMG 2.16 using GeFanuc Ethernet switches (cp6-gesw24m3)

c. Dintek (http://www.dintek.com.tw/)
   a. P/N
      i. DS-752841004, 2U, 2x250W AC power supplies
      ii. DS-754841008-G01, 4U, 3x250W AC power supplies
   i. Good power management and distribution
   ii. Good airflow
   iii. Hot-inserting a power supply may cause a sudden drop in power

- Other chassis tested that do not provide the appropriate requirements for running the **TelcoB**ridges blades:
  a. Adlink cPCIS-3330/64/AC and cPCIS-3330/AC
     i. Power distribution is deficient. It is not equal on all slots and power fluctuations have been noted
     ii. Average airflow
     iii. 2.16 chassis not supported properly
  b. Advantech - MIC3056
     i. Average power management and distribution
     ii. Airflow is insufficient : we recommend removing the filter from the fans
  c. Dintek 10U chassis
     i. System must have a minimum of three blades to start
     ii. Performance is acceptable

Tip All **TelcoB**ridges system-blades include three temperature sensors for chassis airflow analysis. These can be read at anytime using the tb640debug tool/sample program

1.4. Control System (Host)

To control the **TelcoB**ridges system-blades, any host can be used. It can be a server external to the CompactPCI chassis or it can also be a CompactPCI CPU blade. External servers are recommended since they usually provide more power for less cost and any number of them can be used to control the system (do not require a cPCI slot).

1.4.1. Windows system:

- Pentium 4 - 3Ghz or higher processor with 1GB RAM
- Windows 2000 Professional/Server with Service Pack 3 or later, or Windows XP with Service Pack 2 or later
  Important Note The system-blades software package has not been tested on any other version of Windows
- WinZip 8.0 or equivalent application
- HyperTerminal or equivalent application
- Two 1Gbps Ethernet adapter. We recommend 1Gbps in all conditions.
- Microsoft Visual Studio 6.0 with Service Pack 5 installed
- We recommend installing the latest version of cygwin installed (http://www.cygwin.com/) to be able to compile projects using the ‘make’ utility. During the installation ,we recommend setting the following modules to ‘install’:

Archive	Install
Devel	Install
Doc	Install
Interpreters	Install
Net	Install
Perl	Install
Shell	Install
Utils	Install

- In case where cygwin is installed, GNU MAKE utility version 3.80 or equivalent (not 3.81) is required.

  Important Note The system-blades software package has not been tested with other make versions

1.4.2. Solaris system:

- Sparc-based system at 1Ghz or more with 1GB of memory; OR
- Intel or AMD-based system at 3Ghz or more with 1GB of memory
- Solaris 8, 9 or 10, with Sparc 32 or 64 bits or Intel, 32 bits or 64 bits or AMD, 32 bits or 64 bits
- GNU compiler gcc-3.2.1-1.2.0 or equivalent. The system-blades software package has not been tested with other compiler versions
- GNU MAKE utility make-3.80-1.2.0 or equivalent (not 3.81). The system-blades software package has not been tested with other compiler versions
- GZIP utility version 1.2.4 or equivalent.
- Two 1Gbps Ethernet adapter. We recommend 1Gbps in all conditions.
- Use the OPENPKG script openpkg-1.2.0-1.2.0.sparc64-solaris2.8-cw.sh to install the GNU compiler and GNU MAKE utility on a clean machine
- The above utilities and applications (except Solaris 8 64 bits and GZIP) are available freely over the Internet at **http://www.openpkg.org//**

1.4.3. Linux system:

- Intel or AMD-based system at 3Ghz or more with 1GB of memory;
- Linux 32 or 64 bits version with kernel 2.6 or later. We have tested the following version:
  - Red Hat Enterprise 4 Workstation (and update 2)
  - Fedora Core 4
  - Gentoo 2006.2
  - Ubuntu 6
  - Other versions can be tested upon request
- GNU compiler gcc-3.2.3 or equivalent. The system-blades software package has not been tested with other versions
- GNU MAKE utility make-3.80 or equivalent (not 3.81). The system-blades software package has not been tested with other compiler versions
- GZIP utility version 1.2.4 or equivalent
- Two 1Gbps Ethernet adapter. We recommend 1Gbps in all conditions.

1.5. TB-StreamServer

The TB-StreamServer is a **TelcoB**ridges software application running on a host. As with the control system, the TB-StreamServer can run on any host. The performance of the TB-StreamServer depends on the hardware running the application. Refer to the “tb640/tb/tbstreamserver hardware guide.pdf” for more details.

1.6. Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It can occur if electronic printed circuit cards are improperly handled and can cause complete or intermittent failures.

Always follow ESD prevention procedures when removing and replacing modules:

• Ensure that the **TelcoB**ridges System-Blade is electrically connected to earth ground.

• Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the **TelcoB**ridges System-Blade to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.

• If no wrist strap is available, ground yourself by touching a metal part of the chassis.

2. TB640-E1/T1/J1 Hardware Installation

Important Note To install the TB640-E1/T1/J1 you will require one SCSI-3 cable per 16 trunk (see Table 1 Number of connectors with TB640-E1/T1/J1)

TB640 front blade	TB640 rear blade	Number of trunks	Number of SCSI-3 cables	Number of patch panels	Number of RJ-48 connectors
TB640F-16T	TB640R-0T	16	1	1	2
TB640F-32T	TB640R-0T	32	2	1	4
TB640F-32T	TB640R-16T	48	3	2	6
TB640F-32T	TB640R-32T	64	4	2	8

Table 1 Number of connectors with TB640-E1/T1/J1

Note:

- E1/T1/J1 maximum line length is 655 feet or 200 meters
- See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from the right all the way to the left in a vertical chassis and from the bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB640-E1/T1/J1 in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.
4. Insert the TB640-E1/T1/J1 front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
    - Make sure the TB640-E1/T1/J1 is inserted in the same slot number of the rear panel.
    - Do not insert the TB640-E1/T1/J1 in the system slot (this slot is usually red or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.

Install a null modem serial cable on the TB640-E1/T1/J1 rear panel RS-232C connector to a terminal or a system running a terminal application. See Annex V Serial Cable to TelcoBridges System-Blade and Table 12 Ethernet RJ-45 pinout

7. Annexe IV DB-9 Serial Pinout.
8. Connect a standard Ethernet cable in port #1 of the TB640-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
9. Connect a standard Ethernet cable in port #2 of the TB640-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This

must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).

10. Connect the SCSI-3 (HD68) cables to the TB640-E1/T1/J1 rear panel (see Figure 1 – TB640-E1/T1/J1 Front and Rear panel view). Connect the SCSI-3 cables on the RJ-48 patch box. Each RJ-48 patch box supports 32 trunks and eight (8) line interfaces (E1/T1/J1). The patch boxes are either RJ-48T or RJ-48M (ANSI T1.403 compliant). See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges.

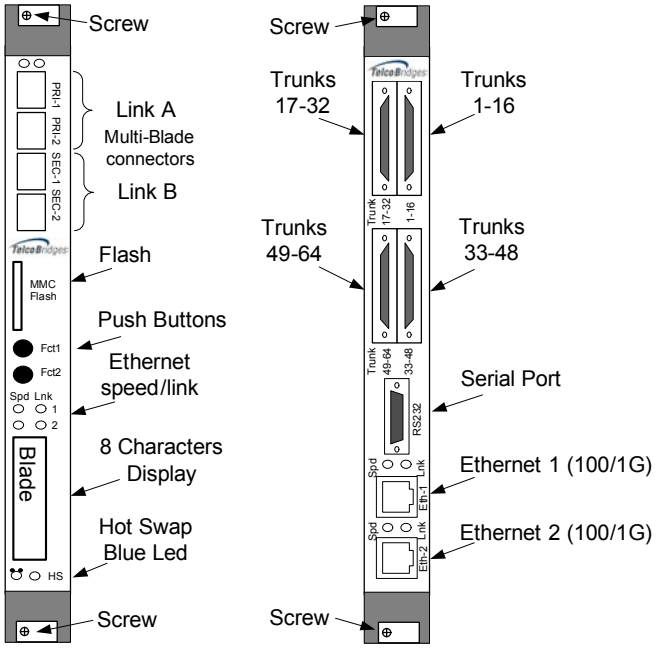

Figure 1 TB640-E1/T1/J1 Front and Rear panel view, 64 trunks and TB-Multi-Blade interfaces

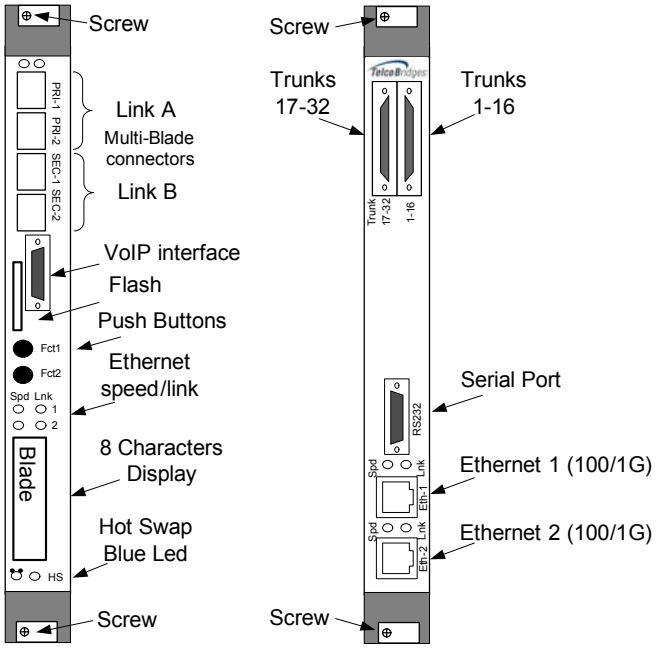

Figure 2 TB640-E1/T1/J1 Front and Rear panel view, 32 trunks, VoIP and TB-Multi-Blade interfaces

11. If your system-blade is equipped with the TB-Multi-Blade Mezzanine see TB-Multi-Blade Hardware Installation for installation procedure.
12. If your system-blade is equipped with the TB-VoIP Mezzanine go to Annex VII TB-VoIP Mezzanine + Procedure
13. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis
14. Power on the CompactPCI chassis if not powered on.

3. TB640-DS3 Hardware installation

Important Note To install the TB640-DS3 you will require two coaxial cables per DS3 interface

Interface	Rate	Connector Type	Wavelength	Maximum Distance
DS3	44.736 Mbps	BNC	Coaxial	450 feet or 137.16 meters

DS3 Interface Specifications

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from right all the way to the left in a vertical chassis and from bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB640-DS3 in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.
4. Insert the TB640-DS3 front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
   - Make sure the TB640-DS3 is inserted in the same slot number of the rear panel.
   - Do not insert the TB640-DS3 in the system slot (this slot is usually red and/or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharge.

Install a null modem serial cable on the TB640-DS3 rear panel RS-232C connector to a terminal or a system running a terminal application. See Annex V Serial Cable to TelcoBridges System-Blade and Table 12 Ethernet RJ-45 pinout

7. Annexe IV DB-9 Serial Pinout.
8. Connect a standard Ethernet cable in port #1 of the TB640-DS3 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
9. Connect a standard Ethernet cable in port #2 of the TB640-DS3 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
10. Connect the BNC connector to the TB640-DS3 rear panel (Figure 2 – TB640-DS3 Front and Rear panel view).Connect the BNC cable to the add/drop MUX of DACS (Digital Access Cross-connect Switch). Each of the BNC connector supports 28 T1/J1 or 21 E1 trunks. See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges.

TB640-DS3 blade	TB640 rear blade	DS3 Interface	Number of trunks
TB-DS3F	TB-DS3R-BNC	1	Up to 28 T1/21 E1
TB-DS3F	TB-DS3R-BNC	2	Up to 56 T1/42 E1
TB-DS3F	TB-DS3R-BNC	3	Up to 84 T1/63E1

Table 2 Number of connectors with TB640-DS3

11. If your system-blade is equipped with the TB-Multi-Blade Mezzanine see TB-Multi-Blade Hardware Installation for installation procedure.
12. If your system-blade is equipped with the TB-VoIP Mezzanine go to Annex VII TB-VoIP Mezzanine + Procedure
13. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis.
14. Power on the CompactPCI chassis if not powered on.

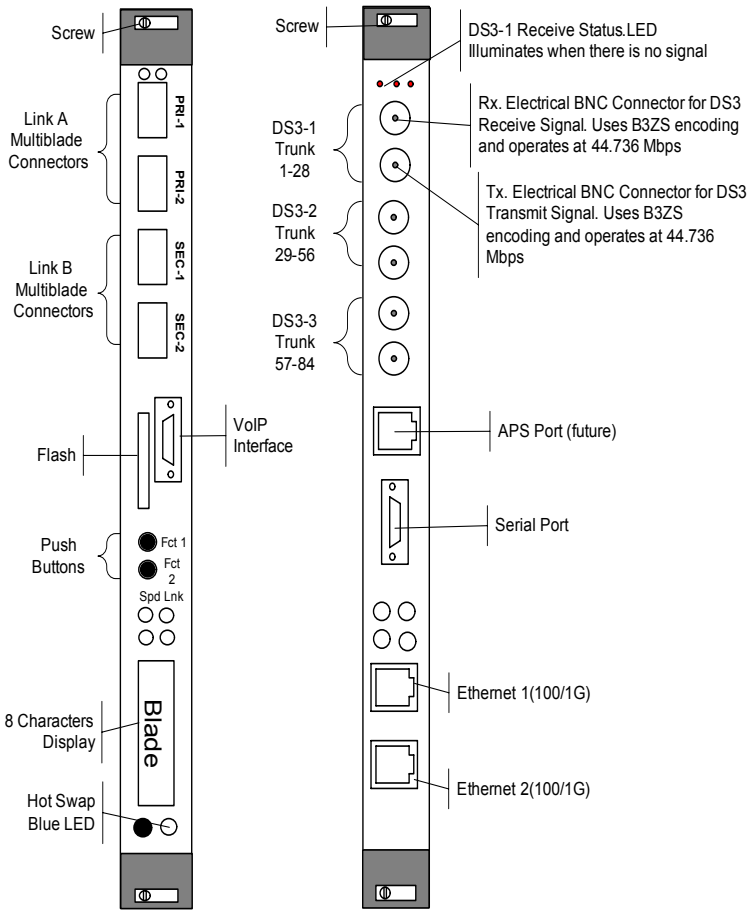

Figure 3 TB640-DS3 Front and Rear panel view, 3x DS3, VoIP and TB-Multi-Blade interfaces

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4. TB640-OC3/STM-1 Hardware Installation

Important Note To install the TB640-OC3/STM-1 you will require two 1310 nm SFP, LC Type Single Mode Fiber

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from right all the way to the left in a vertical chassis and from bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB640-OC3/STM-1 in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharge.
4. Insert the TB640-OC3/STM-1 front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
    - Make sure the TB640-OC3/STM-1 is inserted in the same slot number of the rear panel.
    - Do not insert the TB640-OC3/STM-1 in the system slot (this slot is usually red or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharge.

Install a null modem serial cable on the TB640-OC3/STM-1 rear panel RS-232C connector to a terminal or a system running a terminal application. See Annex V Serial Cable to TelcoBridges System-Blade and Table 12 Ethernet RJ-45 pinout

7. Annexe IV DB-9 Serial Pinout.
8. Connect a standard Ethernet cable in port #1 of the TB640-OC3/STM-1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
9. Connect a standard Ethernet cable in port #2 of the TB640-OC3/STM-1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
10. Connect the optical fiber cables to module 1 location of the TB40-OC3/STM-1 rear panel for the main link and optical fiber to module 2 for ASP protection. Each of the optical fiber connector supports 84 T1/J1 or 63 E1 trunks.

TB640-OC3/STM-1 blade	TB640 rear blade	Optical Fiber Cables	Number of trunks
TB-DS3F	TB-DS3R-2 x OC3	2	84T1/63E1

Table 3 Number of connectors with TB640-OC3/STM-1

11. If your system-blade is equipped with the TB-Multi-Blade Mezzanine see TB-Multi-Blade Hardware Installation for installation procedure.
12. If your system-blade is equipped with the TB-VoIP Mezzanine go to Annex VII TB-VoIP Mezzanine + Procedure
13. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis.
14. Power on the CompactPCI chassis if not already in operation.

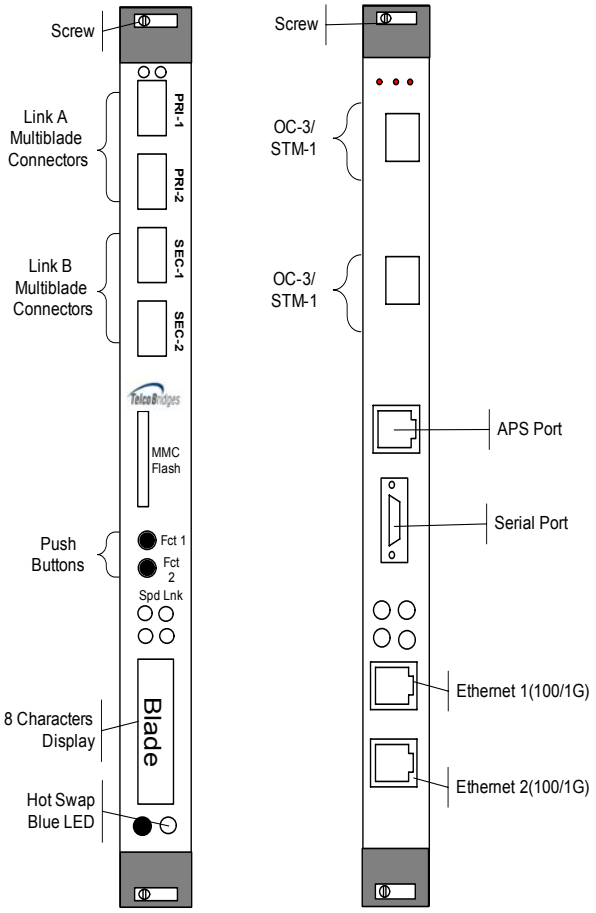


Figure 4 TB640-OC3/STM-1 Front and Rear panel, 1x STM-1, VoIP and TB-Multi-Bladeinterfaces

5. TB-16-E1/T1/J1 Hardware Installation

Note:

- E1/T1/J1 maximum line length is 655 feet or 200 meters
- See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from the right all the way to the left in a vertical chassis and from the bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB-16-E1/T1/J1 in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.
4. Insert the TB-16-E1/T1/J1 front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
    - Make sure the TB-16-E1/T1/J1 is inserted in the same slot number of the rear panel.
    - Do not insert the TB-16-E1/T1/J1 in the system slot (this slot is usually red and/or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.

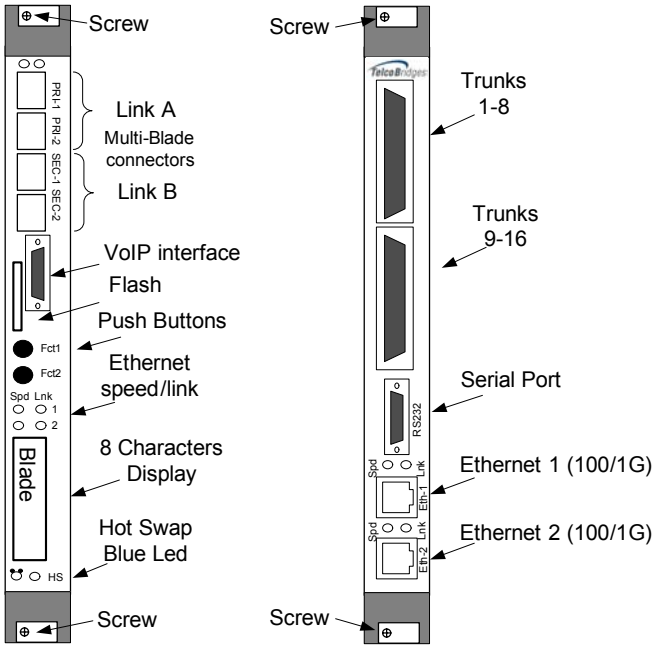


Figure 5 TB-16-E1/T1/J1 Front and Rear panel

Install a null modem serial cable on the TB-16-E1/T1/J1 rear panel RS-232C connector to a terminal or a system running a terminal application. See Annex V Serial Cable to TelcoBridges System-Blade and Table 12 Ethernet RJ-45 pinout

7. Annexe IV DB-9 Serial Pinout.
8. Connect a standard Ethernet cable in port #1 of the TB-16-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
9. Connect a standard Ethernet cable in port #2 of the TB-16-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
10. Connect the SCSI-3 (HD68) cables to the TB-16-E1/T1/J1 rear panel (Figure 5 TB-16-E1/T1/J1 Front and Rear panel). See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges If your system-blade is equipped with the TB-Multi-Blade Mezzanine see TB-Multi-Blade Hardware Installation for installation procedure.
11. If your system-blade is equipped with the TB-VoIP Mezzanine go to Annex VII TB-VoIP Mezzanine + Procedure
12. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis
13. Power on the CompactPCI chassis if not powered on.

6. TB-8-E1/T1/J1 Hardware Installation

Note:

- E1/T1/J1 maximum line length is 655 feet or 200 meters
- See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from the right all the way to the left in a vertical chassis and from the bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB-8-E1/T1/J1 in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.
4. Insert the TB-8-E1/T1/J1 front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
    - Make sure the TB-8-E1/T1/J1 is inserted in the same slot number of the rear panel.
    - Do not insert the TB-8-E1/T1/J1 in the system slot (this slot is usually red and/or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.

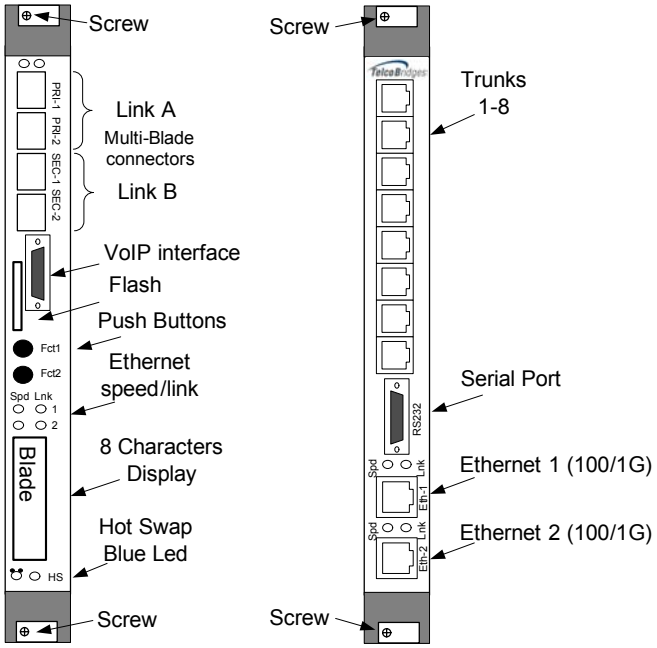


Figure 6 TB-8-E1/T1/J1 Front and Rear panel

7. Install a null modem serial cable on the TB-8-E1/T1/J1 rear panel RS-232C connector to a terminal or a system running a terminal application See Annex V Serial Cable to TelcoBridges System-Blade and Table 12 Ethernet RJ-45 pinout
8. Annexe IV DB-9 Serial Pinout.
9. Connect a standard Ethernet cable in port #1 of the TB-8-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
10. Connect a standard Ethernet cable in port #2 of the TB-8-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
11. Connect the SCSI-3 (HD68) cables to the TB-8-E1/T1/J1 rear panel (Figure 6 TB-8-E1/T1/J1 Front and Rear panel). See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from TelcoBridges.
12. If your system-blade is equipped with the TB-Multi-Blade Mezzanine see TB-Multi-Blade Hardware Installation for installation procedure.
13. If your system-blade is equipped with the TB-VoIP Mezzanine go to Annex VII TB-VoIP Mezzanine + Procedure
14. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis
15. Power on the CompactPCI chassis if not powered on.

7. TB-Multi-Blade Hardware Installation

Note The TB-Multi-Blade supports TB640-E1/T1/JT, TB640-DS3, TB640-OC3/STM-1, TB-16-E1/T1/JT, and TB-8-E1/T1/JT

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from right all the way to the left in a vertical chassis and from bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB-Multi-Blade in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Then use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.
4. Insert the TB-Multi-Blade front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
    - Make sure the TB-Multi-Blade blade is inserted in the same slot number of the rear panel.
    - Do not insert the TB-Multi-Blade in the system slot (this slot is usually red and/or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.

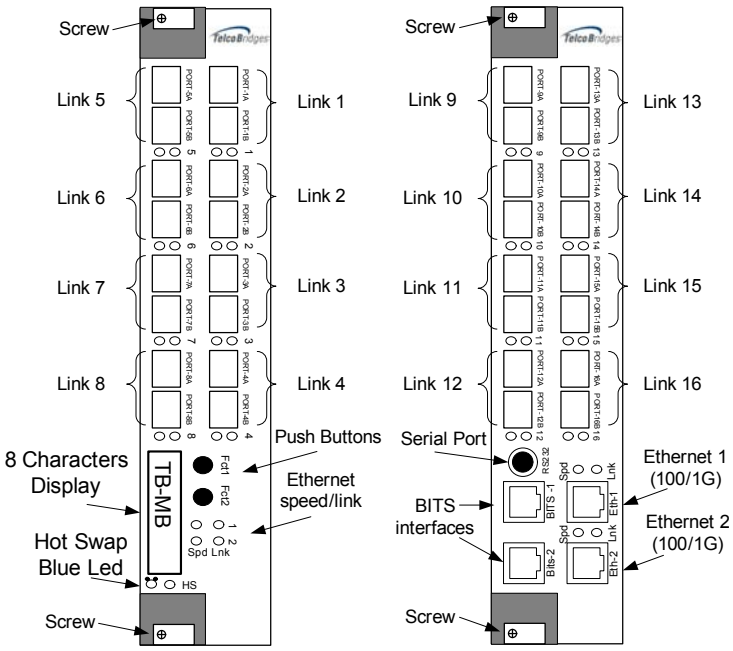


Figure 7 TB-Multi-Blade Front and Rear Panels

7. Install a null modem serial cable from the TB-Multi-Blade DIN-5 to DB-9 adapter that connects to the rear panel to a terminal or a system running a terminal application. Each TB-Multi-Blade comes with a DIN-5 to DB-9 adapter.

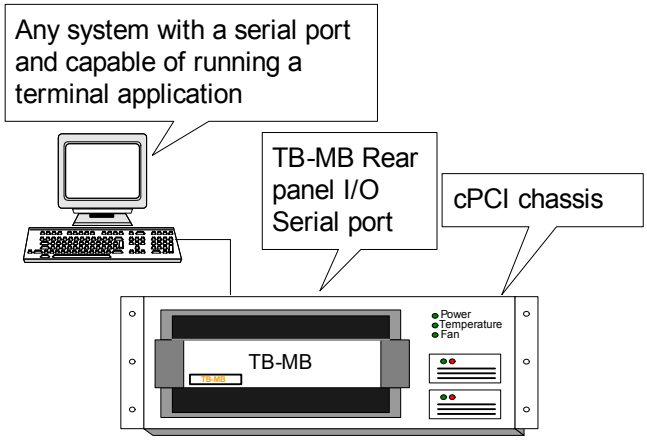


Figure 8 Serial cable to TB-Multi-Blade

8. Connect a standard Ethernet cable in port #1 of the TB-Multi-Blade cables rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
9. Connect a standard Ethernet cable in port #2 of the TB-Multi-Blade cables rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the TelcoBridges System-Blades).
10. Connect the primary TB-Multi-Blade cables (TBlink 1 or Port 1) to the TB640 (PRI-1, PRI-2). One TBlink is composed of two cables and carry clocking and data information. Starting with the first set, connect Port-1A to PRI-1 of a TB640 and Port-1B to PRI-2 of the same TB640. This creates TBlink A. Figure 9 Connecting four system-blades with a redundant TB-Multi-Blade

Important Note: The TB-Multi-Blade cables support a maximum of 30mm bend radius

11. TBlink B (SEC-1, SEC-2) of that TB640 should go to the redundant TB-Multi-Blade (Port-1A, Port-1B) if it is used.
12. On the primary TB-Multi-Blade, TBlink 2 (Port 2) should connect to the second TB640 (TBlink A) in the system, and so on.
13. Connect the BITS interfaces. If used, this can provide the clock of the system. To provide clock redundancy, the second BITS port must be connected to the redundant TB-Multi-Blade.
14. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis.
15. Power on the CompactPCI chassis if not powered on.

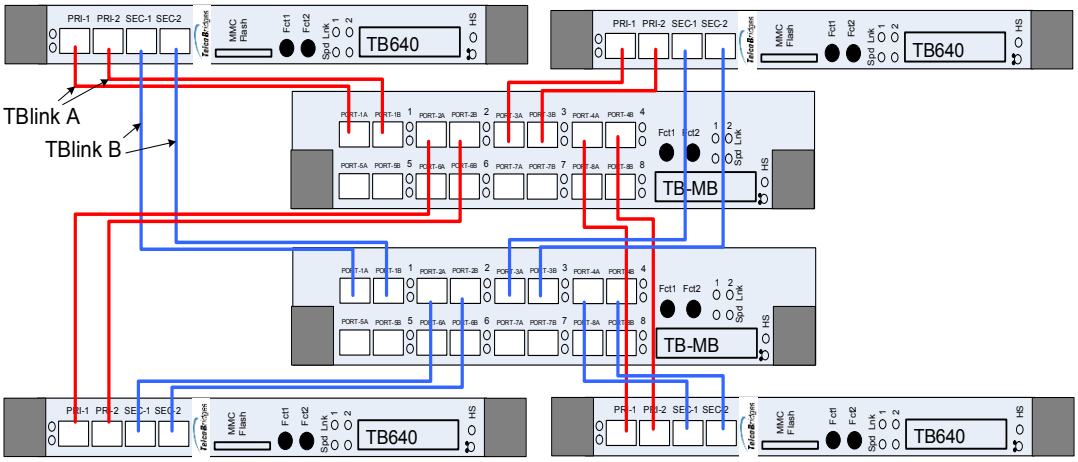


Figure 9 Connecting four system-blades with a redundant TB-Multi-Blade

8. TB-Video Hardware Installation

Important Note To install the TB-Video you will require two SCSI-3 cables (see Table 4 Number of connectors with TB-Video)

TB-Video front blade	TB-Video rear blade	Number of trunks	Number of SCSI-3 cables	Number of patch panels	Number of RJ-48 connectors
TB-Video	TB-Video	32	2	1	4

Table 4 Number of connectors with TB-Video

Important Note The TB-Video does not support the TB-Multi-Blade

Note: See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from **TelcoB**ridges

To maximize airflow in a CompactPCI chassis, the blades must be installed starting from the right all the way to the left in a vertical chassis and from the bottom all the way to the top in a horizontal chassis. Do not leave any empty slots between the blades when installing them.

1. Install the rear panel of the TB-Video in the CompactPCI chassis (chassis can be powered on or not). Gently push the rear panel until there is some resistance.
2. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
3. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.
4. Insert the TB-Video front panel in the CompactPCI chassis peripheral slot (this slot is usually black and/or indicated with a circle). Gently push the front panel until there is some resistance.
    - Make sure the TB-Video is inserted in the same slot number of the rear panel.
    - Do not insert the TB-Video in the system slot (this slot is usually red and/or indicated with a triangle).
5. Use the upper and lower brackets to push the panel all the way in the backplane. The brackets should lock in.
6. Install the lower and upper screws in the CompactPCI chassis. This helps eliminate electrostatic discharges.

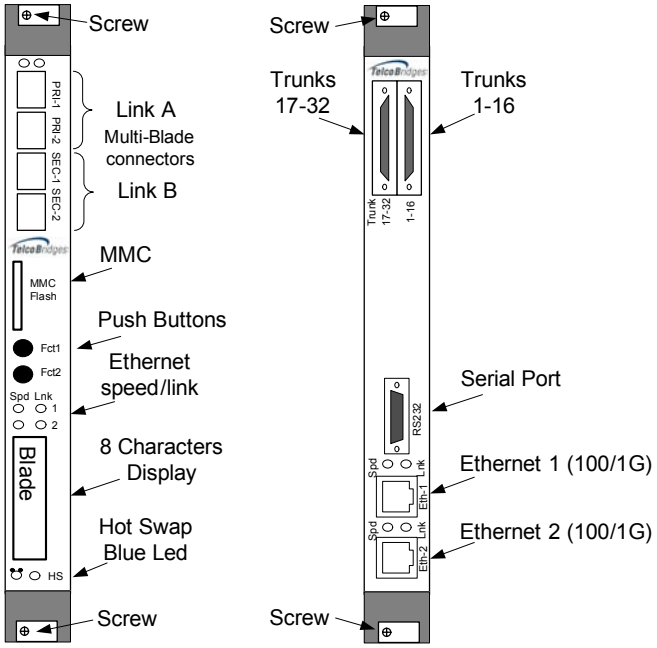


Figure 10 TB-Video Front and Rear panel

Install a null modem serial cable on the TB-Video rear panel RS-232C connector to a terminal or a system running a terminal application. See Annex V Serial Cable to **TelcoBridges** System-Blade and Table 12 Ethernet RJ-45 pinout

7. Annexe IV DB-9 Serial Pinout.
8. Connect a standard Ethernet cable in port #1 of the TB640-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the **TelcoBridges** System-Blades).
9. Connect a standard Ethernet cable in port #2 of the TB640-E1/T1/J1 rear panel (Annex VI Ethernet Connection to TelcoBridges System-Blades and Annexe III Ethernet RJ-45 Pinout. This must be on the same physical network and subnet as the host processor running the application (go to Configuring the **TelcoBridges** System-Blades).
10. Connect the SCSI-3 (HD68) cables to the TB-Video rear panel (Figure 10 TB-Video Front and Rear panel). See Annex I Cable and Connector Pinouts and Annex II Patch Panel Connectors for patch panel information from **TelcoB**ridges.
11. Install blinds on all empty slots in the chassis to maximize airflow in the CompactPCI chassis
12. Power on the CompactPCI chassis if not powered on.

9. LED Description

LED	Color	Description
Spd 1 and 2	None	No power
	Red	10 Mbps (should not be used)
	Green	100Mbps
	Orange	1000 Mbps (recommended)
Lnk 1 and 2	None	No power
	Red	Not connected
	Blink Green	Ethernet activity

Table 5 Blades Speed and Link LED description

LED	Color	Description
Port 1 to 16	None	No power
	Green	No Alarm
	Yellow	Minor Alarm
	Red	Major Alarm
	Blinking	Link used as clock reference

Table 6 TB-Multi-Blade port LED description

10. Software Installation

You will need to go to the **TelcoB**ridges web site to download the latest version of the software.

1. Go to www.telcobridges.com
2. On the upper right hand corner you will see the Customer Login. Enter your username and password and click on the login button (your username and password should have been provided to you by the **TelcoB**ridges support group).
3. Select the package required for your operating system and begin the download process. There are four archives to download if you require a full package installation:
4. The common package containing OS-agnostic code such as header files, samples, source files, generic makefiles, etc). This file is named tb640_<MM>.<mm>.<dd>.<rc>_common.tgz where <MM> is the major version, <mm> is the minor version, <dd> is the decimal value and <rc> the release candidate tag.

   i.e. tb640_0.94.8.3_common.tgz

5. The OS-specific binary package containing already compiled binaries such as libraries, tools, etc). This file is named tb640__<MM>.<mm>.<dd>.<rc>_<processor>-<os/arch>_<buildtype>.tgz.

   i.e. tb640_0.94.8.3_i586-linux_release.tgz
   tb640_0.94.8.3_x86_64-linux64_release.tgz
   tb640_0.94.8.3_i586-solaris32_release.tgz
   tb640_0.94.8.3_i586-win32_release.tgz
   tb640_0.94.8.3_i586-win32_release_dll.tgz
   tb640_0.94.8.3_sparc-solaris32_release.tgz
   tb640_0.94.8.3_sparc-solaris64_release.tgz
   tb640_0.94.8.3_ppc-vxworks_release.tgz

6. The TB640/TB-Multi-Blade firmware file package. This package contains the compressed image that is uploaded to the TB640 and runs the embedded code. The file is named tb640-adapter.release.zip. This image is common to all **TelcoB**ridges' TB640s.
7. The documentation package (tb640-doc.zip) contains user's guides, API documents (in HTML and CHM formats), application notes, design guides and release notes.

10.1. Windows package installation steps

To install the TB640 packages onto Windows machine using GUI:

1. Log onto the machine using an account with administrator privileges
2. Create a new directory using the file explorer

   C:\tbrel

3. Using the file explorer, click on the common package, the OS specific package and the firmware package (specified in Section 6) and uncompress them into the newly created directory. For this to work, you must have WinZip 8.0 installed or an equivalent software (refer to section 1.4.1).
4. Make sure winpcap version 3.1 (or winpcap 4.0.1) is installed on the system to run the Stream Server and other applications. To do this, go to http://www.winpcap.org/, download the package and follow the instructions.
5. If this is a new blade, go to section "Configuring the TelcoBridges System-Blades. If blades are already configured, go to section "Upgrading the TelcoBridges System-Blades ".

10.2. Solaris, Linux and Windows (Cygwin) packages installation steps

To install the TB640 packages onto a Solaris, Linux or Windows (using Cygwin) machine:

1. Log onto the machine using an account with supervisor privileges (or administrator privileges in the case of Windows).
2. Start a bash shell by typing the command 'bash' in a shell prompt.
3. The paths must be set up correctly to be able to call '**make**', '**gcc**' and '**gunzip**' applications. If the paths are set up correctly, then
   - **make** should output "**make: *** No target specified…**"
   - **gcc** should output "**gcc: no input files**"
   - **gunzip** should output "**gunzip: compressed data…**"

   If this doesn't work, then you need to set up the paths correctly.
4. Create a new directory using the command
   mkdir tbrel
   cd tbrel
5. Uncompress the common package, the OS specific package and the firmware package (specified in Section 6) into the directory:
   gunzip *tgz
   tar –xvf tb640_0.94.8.3_common.tar *[filename used as an example]*
   tar –xvf tb640_0.94.8.3_i586-win32_release.tar *[filename used as an example]*
   unzip tb640-adapter.release.zip *[filename used as an example]*
6. Make sure libpcap version 0.8.3 or more recent is installed on the system to run the Stream Server and other applications. To do this, go to http://www.tcpdump.org/ or http://www.sunfreeware.com, download the package and follow the instructions.
7. If this is a new blade, go to section "Configuring the TelcoBridges System-Blades. If blades are already configured, go to section "Upgrading the TelcoBridges System-Blades ".

10.3. Package components

10.3.1. Common package content:

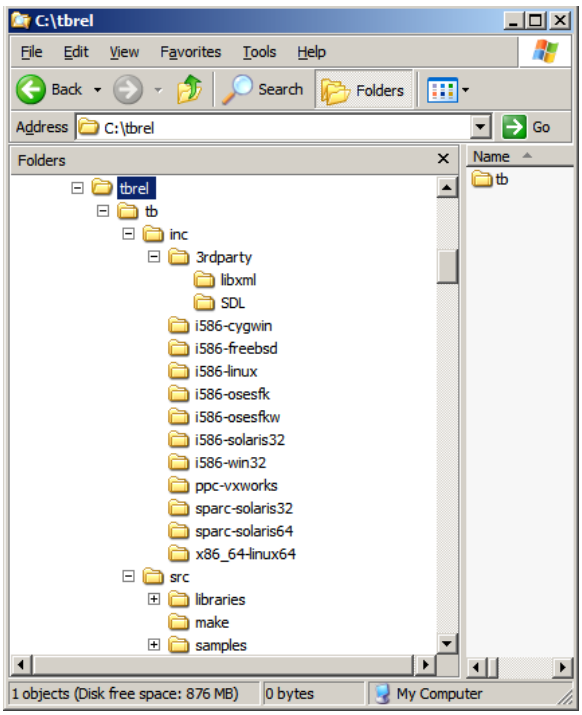


Figure 11 Common package content

Filename or Directory	Description and use
/tb/inc	Files required to compile sample applications.
/tb/inc/<processor>-<os/arch>	Files specific to a processor/operating system/architecture combination and required to compile sample applications.
/tb/inc/3rdparty/SDL	SDL (Simple DirectMedia Layer) library that some samples use to play sound through the sound card.
/tb/inc/3rdparty/libxml	XML library that the sample 'voiceprocessing' uses for scripting.
/tb/inc/3rdparty/<TTS engine includes>	TTS engine includes. Hcilab, IFlytek, Neospeech, Sinovoice
/tb/src/libraries	Contains different utility libraries with their sources that are required to build some of the sample applications.
/tb/src/make	Contains the makefile and sub-makefiles required to compile sample applications.
/tb/src/samples	Contains the numerous sample application sources.
/tb/src/samples/call_bridging/*.c and *.h	Sample program that integrates SS7, ISDN, SIP, TDM, VoIP, TB-Multi-Blade and IVR. It uses the ss7_ha_manager as a basis for configuration, monitoring and high availability. It also uses the call control libraries for SIP, SS7, ISDN, connection.
/tb/src/samples/cas/*.c and *.h	Source, header and makefile required to compile and run the "cas" sample application. This sample demonstrates the proper CAS call state machine handling.
/tb/src/samples/cas/casstates.pdf	Explains the states and transitions used in the CAS sample program.

/tb/src/samples/common	Common source used by other samples
/tb/src/samples/conf/*.c and *.h	Source, header and makefile required to compile and run the "conf" sample application. It demonstrates how to manage conferences with voice processing groups and resources.
/tb/src/samples/connection/*.c and *.h	Source, header and makefile required to compile and run the "connection" sample application. It demonstrates how to pre-allocate trunk, a-law/u-law and CTBus resources. It also demonstrates the use of synchronous and asynchronous API calls.
/tb/src/samples/fsk/*.c and *.h	Source, header and makefile required to compile and run the "fsk" sample application. This sample is the source code of the tool to allocate fsk resources, and send/receive fsk messages.
/tb/src/samples/install/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/install	Source, header and makefile required to compile and run the "install" sample application. This sample is the source code of the tool to update the TB640 blade package.
/tb/src/samples/isdnext/*.c and *.h	Source, header and makefile required to compile and run the "ISDN" sample application. This sample demonstrates the proper ISDN call state machine handling.
/tb/src/samples/mbl/*.c and *.h	Source, header and makefile required to compile and run the "mbl" sample application. This sample demonstrates the usage of the TB-Multi-Blade and how to make connections from two TB640 through to the TB-Multi-Blade.
/tb/src/samples/np1/*.c and *.h	Source, header and makefile required to compile and run the "np1" sample application. This sample application demonstrates how to monitor blade faults (and perform the switchover).
/tb/src/samples/showmblport/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/showmblport	Management and status of multi-blade ports.
/tb/src/samples/showtrunk/*.c and *.h	Replaced by tbshowls
/tb/src/samples/sip_callctrl/*.c and *.h	SIP call control sample program to be used with ss7_ha_manager
/tb/src/samples/ss7/*.c and *.h	Source, header and makefile required to compile and run the "ss7" sample application. Demonstrates the proper SS7 call state machine handling.
/tb/src/samples/ss7/ss7states.pdf	Explains the states and transitions used in the SS7 sample program.
/tb/src/samples/ss7_ha/*	SS7 call control sample program to be used with ss7_ha_manager
/tb/src/samples/standalone/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/standalone	Sample program used for TM-1000
/tb/src/samples/stream/callshandler.pdf	Explains the states used in the "callshandler "program.
/tb640/samples/stream/callsgenerator/*.c and *.h	Sample application that runs on the host and initiates calls. Used with callshandler.
/tb/src/samples/stream/callshandler/*.c and *.h	Sample application that runs on the host and controls the TB640 and TB-StreamServers (systems running TB-StreamServer). It answers calls and plays files. (see TB-StreamServer User's Guide)
/tb/src/samples/stream/loopback/*.c	Sample application that loopbacks incoming RTP packets

and *.h	to sender or other destination.
/tb/src/samples/stream/tbstreamlisten/*.c and *.h	Sample code for the tool used to capture data streams from the TDM network. DSPs are required on the blades.
/tb/src/samples/stream/tbstreamplayer/*.c and *.h	Sample application that runs on a TB-StreamServer. Uses the "play" function only. (see TB-StreamServer User's Guide)
/tb/src/samples/stream/tbstreamserver_test/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/tbstreamserver_test	This sample code is used to control Stream Server manually. Useful mostly for unit testing. SeeTB-StreamServer User's Guide
/tb/src/samples/stream/tbstreamserver_dbmanager/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/tbstreamserver_dbmanager	Source code for the tool to manage the Stream Server database. Stream Server must be stopped to run.
/tb/src/samples/stream/tbstreamserver_test_bench/*.c and *.h	Source code for the tool to analyze the performance of a Server used to run a Stream Server
/tb/src/samples/tb640clock/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/tb640clock	Source code for the tool to setup the system clocking
/tb/src/samples/tb640debug/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/tb640debug	Puts information about the blade in a file (includes blade information, trunk configuration, and connections)
/tb/src/samples/tb640display/*.c and *.h	Changes the 8 digit display screen in front of the TB640 blades.
/tb/src/samples/tbclear/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/tbclear	Source, header and makefile required to compile and run the "tbclear" sample application. It demonstrates how to clear all opened resources on the TB640. The code base can be adapted to clear only parts of the resources (for example only one trunk).
/tb/src/samples/tbcomm/*.c and *.h	Source code for a sample program to show how to communicate inter-process with the TBX host libary.
/tb/src/samples/tbshowls/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/tbshowls	Sample program that checks the status of the physical interfaces status (E1/T1/J1, DS3 or OC3/STM-1). This tool replaces the showtrunk sample program.
/tb/src/samples/tcap/*.c and *.h	TCAP sample program. It uses the ss7_ha_manager for configuration.
/tb/src/samples/tone/*.c and *.h	Sample application that allocates voice processing resources for tone detection and generation.
/tb640/samples/voiceprocessing/*.c and *.h /tb/bin/<buildtype><processor>-<os/arch>/voiceprocessing	Sample application that demonstrates the use of voice processing resources, resource allocation, connections, streaming.
/tb/src/samples/voip/*.c and *.h	Sample application that demonstrates and tests the use of VoIP features of the TB640.
/tb/src/libraries	Contains different utility libraries with their sources that are required to build some of the sample applications.
/tb/src/libraries/tbxappsutil	Source library containing various utility functions (MD5, string manipulation functions). This library is used by some of the samples.
/tb/src/libraries/tbxdigitmap	CMC
/tb/src/libraries/tbxlsutil	Source library that offers simplified functions to access trunk resources, line interfaces and line services. This library is used by some of the samples.

/tb/src/libraries/tbxmedia	Source library that offers simplified functions for SDP manipulation. This library is used by some of the samples.
/tb/src/libraries/tbxsiputil	Source library that offers simplified functions for SIP message set configuration. This library is used by some of the samples.
/tb/src/libraries/tbxsmartall_cpp	CMC

Table 7 File descriptions for the 'common' package

10.3.2. OS-Specific package content:

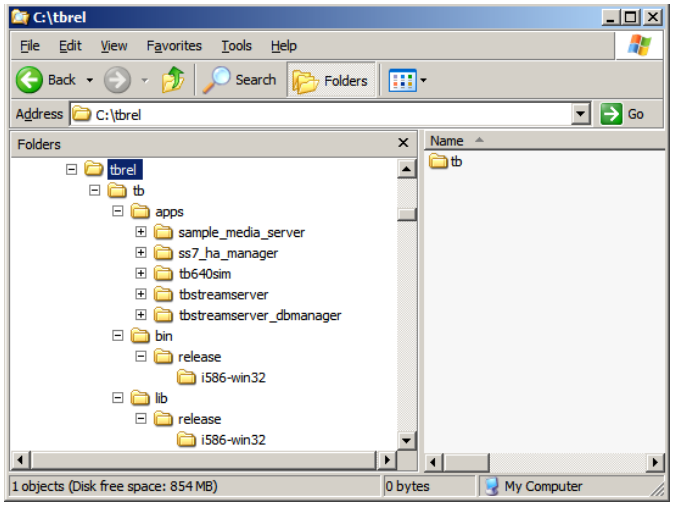


Figure 12 OS-Specific package content

Filename	Description and use
/tb/bin/<buildtype><processor>-<os/arch>	Contains binaries of tools or pre-compiled samples. Also any binary output of any compiled projects (such as samples) will be copied here.
/tb/lib/<buildtype><processor>-<os/arch>	Contains required libraries to compile the samples.
/tb/apps	Directory containing tools and applications in their binary form with their associated configuration files.
/tb/apps/sample_media_server	Simplified video media server application for H.324M services.
/tb/apps/ss7_ha_manager	SS7 system manager application that takes control over one to many blades and handle HA states.
/tb/apps/tb640clock	Tool to setup the system clocking. Not needed if using the ss7_ha_manager
/tb/apps/tb640sim	This tool allows a user to connect trunks from a simulator together or with another simulator for trunk and ISDN/CAS test purposes. It also enables the user to simulate trunk alarms and can record/playback LAPD traces, CAS and tone events from the trunk(s). This application is used with the TB640 simulator but can be used with the real blade to capture LAPD or CAS/tone events from physical trunks. Copies Q.921 frames (raw or Q.931 formatted) or CAS and tone events onto a file.
/tb/apps/tb_service_installer	Program for installing an application as a service in Windows.

/tb/apps/tbstreamlisten	Tool used to capture data streams from the TDM network. DSPs are required on the blades.
/tb/apps/tbstreamserver	TB-StreamServer software, used to manage big database of prompts or ringback tone files, play and record them to System-Blades.
/tb/apps/tbstreamserver_service	Same as tbstreamserver, but as a Windows service
/tb/apps/tbstreamserver_dbmanager	Tool that allows creation and management of TB-StreamServer database files.
/tb/apps/tbstreamserver_tts	Tbstreamserver with Text-to-Speech support
/tb/apps/tbx_videomux	Tool used to convert 3gp file format into TelcoBridges proprietary TBV file format
/tb/apps/udplisten	This program is used to get trace information from the blade. The blades must be configured to transmit UDP logs to a specific IP address and port (set_debug and load_debug in a console window)

Table 8 File description for the 'OS-Specific' package

10.3.3. System-Blade Package Content:

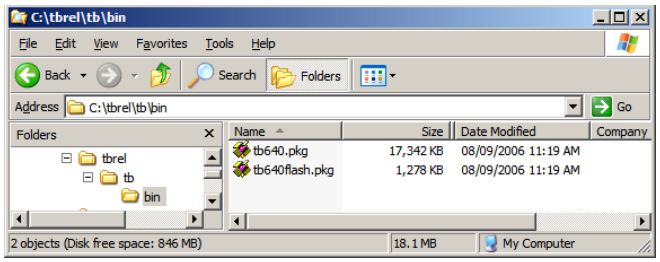


Figure 13 System-blade package content

Filename	Description and use
/tb/bin/tb640.pkg	This is the software residing on the flash for all TelcoBridges products. This software is loaded at startup and programs the local devices, runs the local software and signalling stacks. Use the install tool to install this package. The version of this software can be seen in the tb640debug dump “Build Name”.
/tb/bin/tb640flash.pkg	Low-level firmware for all TelcoBridges products. This package updates the version of some programmable hardware components. Use the install tool to flash this package. This should not be done unless specified by the support group. The version of this firmware can be seen in the tb640debug dump “Rom Build Name”.

10.3.4. Document package content:

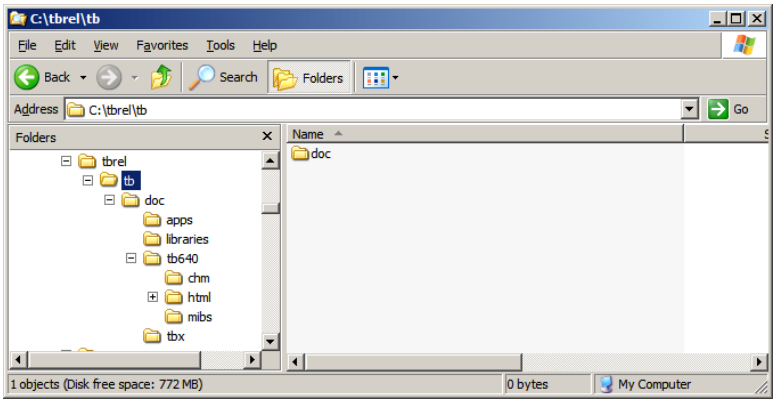


Figure 14 Document package content

Filename	Description and use
/tb/doc/apps	Pre-compiled application documentation.
/tb/doc/cmc	CMC
/tb/doc/libraries	TB640 application libraries documentation.
/tb/doc/tb640	TB640 APIs and supported MIBs documentation
/tb/doc/tbx	Documentation about product common to the whole **TelcoB**ridges family of products.
/tb/doc/apps/tb640 ss7 ha system overview.pdf	This document contains information about an SS7 HA system designed with **TelcoB**ridges' products.
/tb/doc/apps/tb640 ss7 ha manager guide.pdf	SS7 HA Manager Application User's Guide
/tb/doc/apps/tbstreamserver API Reference Guide.pdf	API reference guide to control the TB-StreamServer application.
/tb/doc/apps/tbstreamserver hardware guide.pdf	This document contains the design guide for hardware setup for high performance TB-StreamServers.
/tb/doc/libraries/tb640 ss7 ha callctrl guide.pdf	SS7 Call Control Library User's Guide. Simplifies ISUP call handling and application HA
/tb/doc/libraries/tb640 ss7 ha tcapctrl guide.pdf	SS7 Transaction Control Library User's Guide. Simplifies TCAP transaction handling and application HA.
/tb/doc/tb640/chm/index.chm	Compressed HTML version of the index for all API reference manuals. It is Windows specific.
/tb/doc/tb640/html/index/index.html	HTML version of the index for all API reference manuals.
/tb/doc/tb640/mibs	Contains support SNMP MIBs files.
/tb/doc/tb640/migration guide vX to vX.txt	API changes from release to release. TelcoBridges try to keep those changes to a minimum.
/tb/doc/tb640/Quick Install Guide for TM-1000.pdf	Summary of the TM-1000 installation guide
/tb/doc/tb640/readme_flash.txt	How to flash the blade. Do not use unless instructed by TelcoBridges support
/tb/doc/tb640/release notes.txt	New features in this release and issues fixed. This shows which bug report tracking are fixed (identified by #)
/tb/doc/tb640/tb640 h223 user's guide.pdf	Low-level H.324M process.
/tb/doc/tb640/TB640 Installation	This file. Explains how to install the System-blades

guide.pdf	(TB640, Multi-blade, TB-VIDEO)
/tb/doc/tb640/tb640 sip user's guide.pdf	Low-level SIP guide
/tb/doc/tb640/tb640 ss7 user's guide.pdf	Low-level SS7 guide
/tb/doc/tb640/tb640 user's guide.pdf	Low-level TB640 guide
/tb/doc/tb640/TBDspWizard.html	Tool that calculates how many channels are available when using DSP functions like play, record, tone detection, etc.
/tb/doc/tb640/TBVoipWizard.html	Tool that calculates how many channels are available when using VoIP vocoders
/tb/doc/tb640/TM1000 Installation guide.pdf	Explains how to install the TM-1000
/tb/doc/tbx/TBX API Design Guide.pdf	Explains how to design applications using the TBx architecture of messaging.
/tb/doc/tbx/TBX API Reference Guide.pdf	Contains the API reference for the TBx 'hostlib' library used to communicate with any TBx family product.
/tb/doc/tbx/TBX Streamlib API Reference Guide.pdf	Low-level Stream Server interface document.

11. Configuring the TelcoBridges System-Blades

Important Note Select two IP addresses per system-blade that are free on your network. **TelcoB**ridges system-blades are configured the same way.

11.1. Configuring the System-Blades:

1. For serial connection, configure the terminal console application, such as HyperTerminal at 9600 BPS, 8 bits, no parity, 1 stop bit. For Ethernet connection, use any console application.

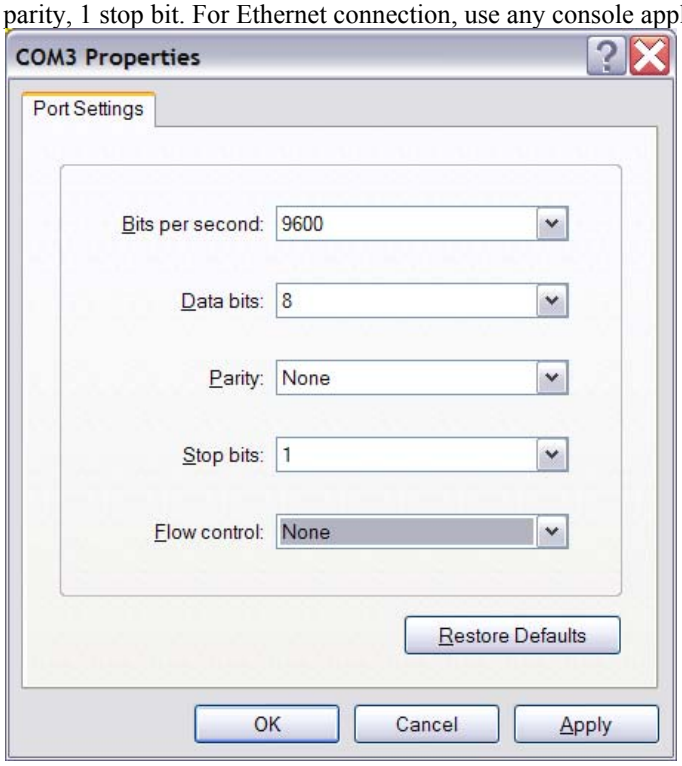


Figure 15 Serial port configuration

2. Type “set_net” at the prompt (“$”) to modify the network configuration of the blade. It includes the name of the blade, if DHCP is enabled, the IP address, the netmask and the gateway address of both Ethernet ports.
3. Type set_pass <your password> to protect the console commands (if desired).
4. Type set_debug to set the debug information to the target system.
5. Type resetbutton 0 to disable to front panel reset button (Fct2).
6. Type “reboot” command to restart and activate the new configuration. Go to Restarting the TB640 Blade.

Note set_net and set_pass requires a restart of the blade to take effect. set_debug takes effect after a restart or after doing “load_debug”.

11.1.1. set_net command:

At the TB640 shell command prompt type “set_net”, the following questions are displayed:

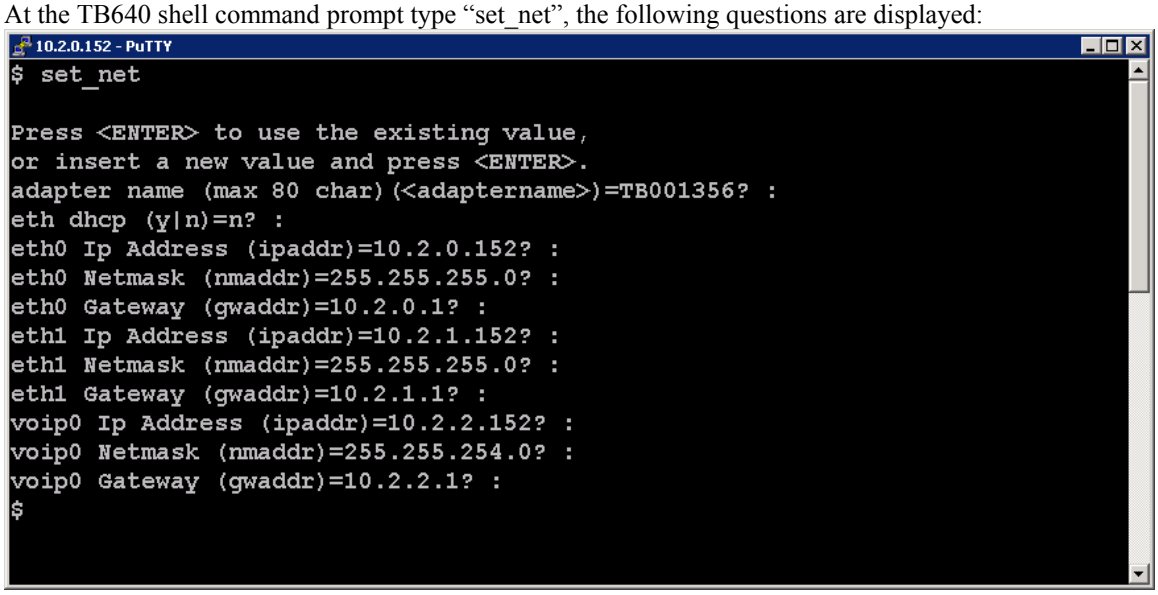


Figure 16 set_net shell command display

adapter name: Name of the TB640. This character string must uniquely identify the blade. The default is the serial number of that blade.

DHCP: Dynamic IP address is used when the blade is started. Currently not supported.

eth0/eth1/voip0: ip address:
If not using DHCP, static IP address for port Ethernet 0, Ethernet 1 and VoIP 0 of the blade

eth0/eth1/voip0: NetMask:
If not using DHCP, network mask for port Ethernet 0, Ethernet 1 and VoIP 0 of the blade

eth0/eth1/voip0: Gateway:
If not using DHCP, gateway address for port Ethernet 0, Ethernet 1 and VoIP 0 of the blade. If you are planning to use the blade in the same subnet as the host (i.e. don’t require accessing an IP address outside the subnet), the gateway can be set to ‘127.0.0.1’.

To make these changes effective you must to restart the blade.

Notes on IP settings:

- voip0 must be on a different subnet than eth0 or eth1. For example, if the netmask is 255.255.0.0 and eth0 IP address is 192.168.1.10, voip0 cannot be on any IP address starting with 192.168.x.x.
- You can either set eth0 or voip0 gateway as the default route. To set the voip 0 interface as the default gateway, you must set the eth0 gateway to 0.0.0.0.
- For additional persistent routes, use the set_route [cpu0|cpu1] shell command. To see the routes, use print_route (cpu0 = eth0, cpu1 = eth1).

11.1.2. print_net command:

At the TB640 shell command prompt type “print_net”, the following information is displayed:

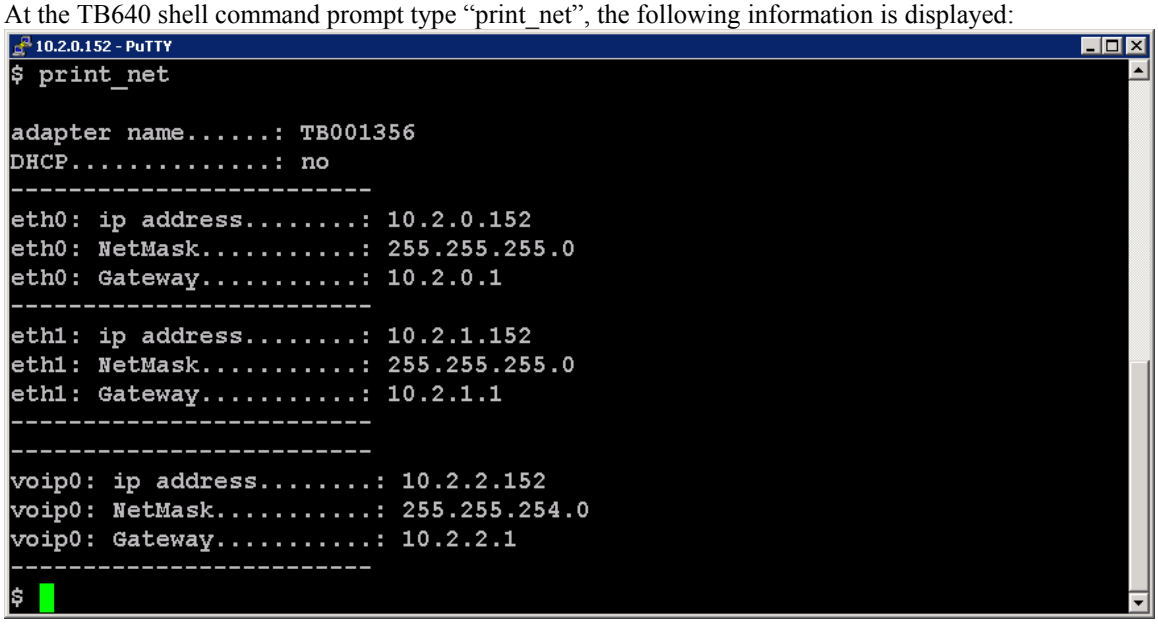


Figure 17 print_net shell command display

11.1.3. Optional shell password:

All sensitive shell commands, like “reboot”, can be protected with a password. By default, there’s no password.

To set the password:

1. Type “set_pass” <your password> at the prompt.
2. Restart the blade. This will reset the console and add the “enable” and “disable” commands in the console commands list

Once the password is set, it cannot be changed unless in enable mode. Enable mode gives you access to sensitive commands.

1. To enter enable mode, type “enable” <your password> at the prompt.
2. To clear the password: Type “set_pass” with no argument. (This disables shell protection)
3. To exit enable mode, type “disable” at the prompt.

11.1.4. Set debug output target system and trace level

The debug output (also called udplisten log) from any **TelcoB**ridges blade can be sent to a target system for analysis. This is useful for debugging applications and systems. Each **TelcoB**ridges blade can send UDP packets on a particular UDP port. cpu0 and cpu1 debug output will send different information, but they can be sent to the same target system.

The default trace configuration is used to log errors only. In some cases, the support group may ask to change these values. Once the test is complete these parameters should be put back to default state (trace level:0, message:n, error:y)

The gateway UDP port is used to separate control messages from different hosts. We recommend not changing this parameter (default UDP gateway is 12358)

The HTTP Server is used to access internal states of the blade with HTTP. The support group may ask you to do this. Otherwise this function should not be used. For protection, a password should be put on this access.

To view the configuration, use print_debug command.

To set a new configuration, use the set_debug command. When complete, type load_debug to activate the new IP address immediately (or reboot the blade).

Once this is completed, you need to run the tb/tb640/tools/udplisten <UDP port #> program to receive the logs.

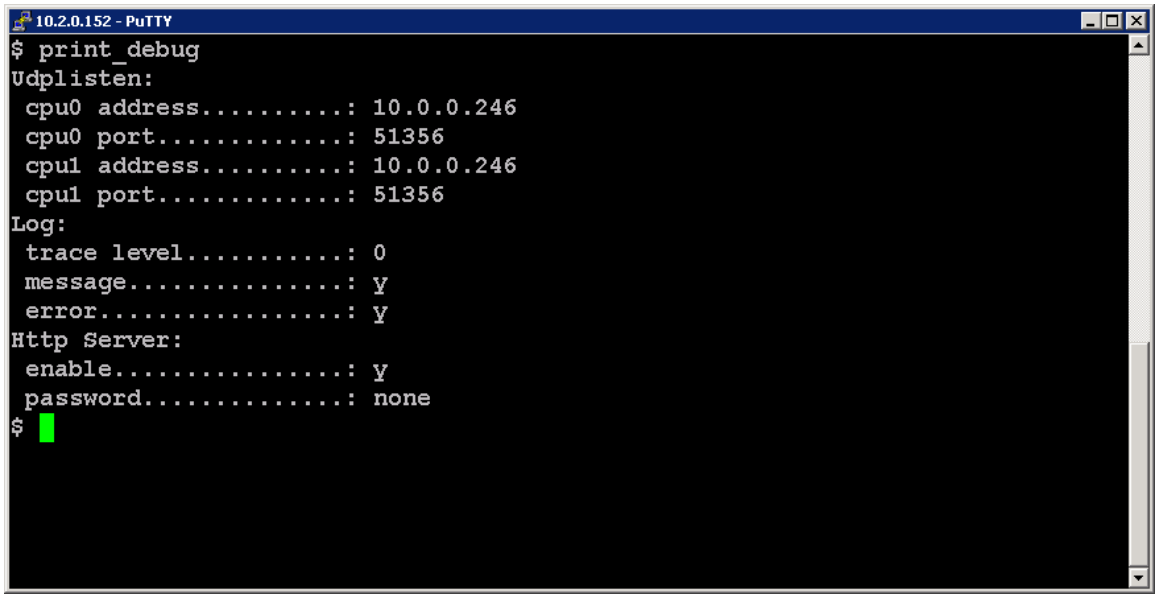


Figure 18 print_debug shell command display

print_debug command example:

Udplisten:

cpu0 address:	IP address where cpu0 (eth0) will send its debug information. If 127.0.0.1 is used, the information will not be sent outside the TB640.
cpu0 port:	UDP port used by cpu0 (eth0) to send its debug information. The convention is to use the serial number digits and add it to 50000. For example, serial number TB000358 will use UDP port 50358.
cpu1 address:	IP address where cpu1 (eth1) will send its debug information.
cpu1 port:	UDP port used by cpu1 (eth1) to send its debug information.

Log:

trace level:	Adjusts the trace level. Trace level 1 is the highest level trace, all the way to level 10 which is almost no traces. Use trace level 0 to disable. <default: 0>
message :	Switches the messages to yes or no. Setting the messages to yes will send to the debug output all messages sent to the **TelcoB**lades blades. <default: n>
error:	Switches the error messages to yes or no. Setting the errors to yes will send to the debug output all errors and other important messages. <default: y>

Http Server:

Enable:	Enables or disables the access to the **TelcoB**lades blade using HTTP. <default: y>
Password:	Can set a password if HTTP access is enabled. <default: none>

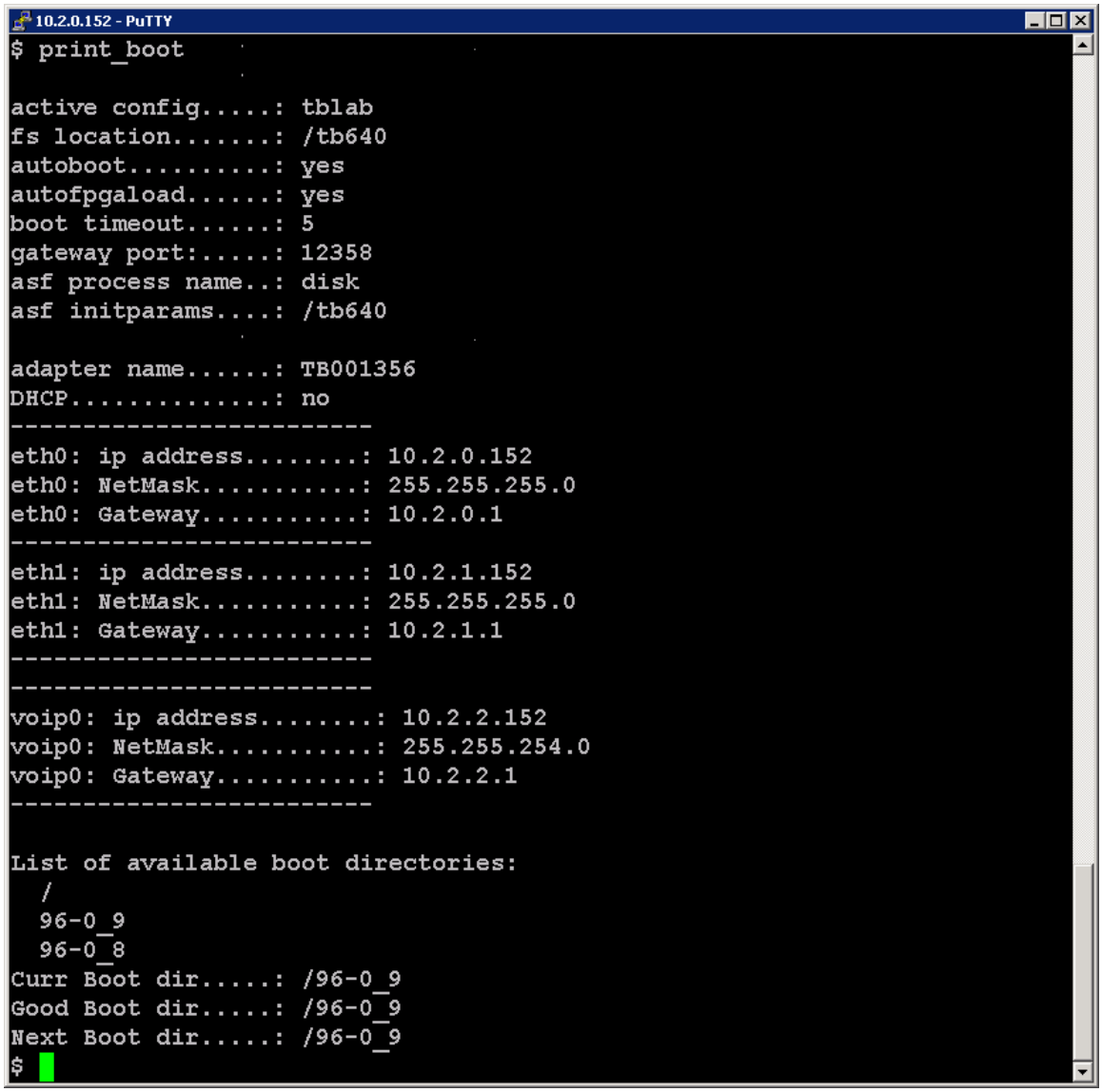
11.1.5. set_boot and print_boot command:

These commands can be used to review if everything is set properly. Additionally, the UDP gateway port can be set. Do not confuse with the IP gateway address.

gateway port:	UDP gateway port used to control the **TelcoB**lades blade. We recommend not changing this parameter. <default: 12358>

Notes on UDP gateway port:

- Blades on the same UDP gateway port will be automatically detected by any application using the TBX host library on the same UDP gateway port.
- Different UDP gateway port can be useful for segmenting application development as well as segmenting deployments that are configured on the same physical network and IP subnet. Make sure all applications are also configured to use the same value.



11.1.6. Front panel reset button

The front panel has two buttons: Fct1 and Fct2. By default, Fct2 is configured to reset (restart) the TB640 or TB-Multi-Blade. To disable the reset function, type “resetbutton 0” at the console. This command is active immediately and will be persistent after restart.

11.1.7. Front panel display

The front panel display can either show three, eight-character strings in a fade in, fade out mode or scroll a character string to the display. To change this mode use “setdisplaymode 0” to use the basic mode or “setdisplaymode 1” to use the scrolling mode. This function requires a restart of the blade. The command is persistent. Use the TB640_MSG_ADAPTER_DISPLAY_CFG_SET message to change the information displayed on the front panel.

11.1.8. Default IP address

When System-Blades are shipped, the default IP addresses are:

- Eth0: ip address: 192.168.0.**2**
- Eth0: Netmask: 255.255.255.0
- Eth0: Gateway: 192.168.0.1
- Eth1: ip address: 192.168.0.**3**
- Eth1: Netmask: 255.255.255.0
- Eth1: Gateway: 192.168.0.1

12. Upgrading the TelcoBridges System-Blades

The **TelcoB**ridges blades start from the local file system located on flash memory. The flash memory comes with a version of the firmware available at production time. You must install the firmware package you will use.

If unsure of which release to install, please contact customer support.

12.1. Installing a firmware package

To install a new firmware package on the local file system:

1. Start the installation tool located in the OS-specific package under /tb/bin/release/<proc-OS-arch>/ directory[1].
2. The installation tool should detect all available TB640s on the network. If more than one blade is discovered, select which one you wish to install.
3. Select option 20: Install a package.
    a. When asked for the path of the package file, enter the path of the file "tb640.pkg" found in the package tb640-adapter.debug.zip under /tb/bin.
    b. When asked to enter the directory to install the package to, enter the name of the directory to use on the **TelcoB**ridges blade (The default is to use the release number as the directory name, for example: "94-8_4").
    c. When asked for the path of the license file, enter the path where you saved the license file (XX_TB000XXX_RELEASE_VX_XX_RCX_license.dat) received from the **TelcoB**ridges support group. It is important you use the one that comes with the package. You must know the serial number of the **TelcoB**ridges blade to be able to choose the right license. For example, you could have license WD_TB000103_RELEASE_V0_94_8_RC4_license.dat for a TB640 with the serial number TB000103 and for release 0.94.
4. After this is done, select option 12: Set the next boot directory and select the directory you just installed the package on.
5. Type yes to restart the blade

If this or any future firmware package is not functional and fails to properly start the blade, the blade will start to the last known good boot directory.

Go o to Sample compilation section.

12.2. Removing a firmware package

A firmware package is around 18 MB. The flash memory is 128 MB. Before you reach this limit, you should remove unused packages from the flash memory.

To remove a firmware package from the local file system:

1. Start the install tool located in the /tb/bin/release/<proc-OS-arch>/ directory.
2. Select option 21: remove a package.
    - Enter the number associated with the package to remove.

[1] To make sure of the compatibility, we recommend using the install from the package actually running on the blade

12.3. Installing a new license

To install a new license:

1. Start the installation tool located in the /tb/bin/release/<proc-OS-arch>/ directory.
2. Select option 22: Install a license.
    - When asked for the path of the license file, enter the path where you saved the license file (XX_TB000XXX_RELEASE_VX_XX_RCX_license.dat) received from the **TelcoB**ridges support group. It is important you use the one that has the same version as the package installed on the blade. You must know the serial number of the **TelcoB**ridges blade to be able to choose the right license. For example, you could have license WD_TB000103_RELEASE_V0_79_RC5_license.dat for a TB640 with the serial number TB000103 and for release 0.79.
3. Restart the **TelcoB**ridges blade if needed.

Notes:

- The license installed can be verified by using option 34 and option 2 of the installation program.
- The license installed can be verified only if the firmware loaded is the same as the running firmware (same versions). This can be checked using option 10.
- To check a license on another firmware, set the next boot directory (option 12) and restart the blade.
- When a license expires, the blade restarts by itself and no features are available until a new license is installed.

Some licenses can be upgraded live without restarting the **TelcoB**ridges blade, others cannot.

Do not restart the TelcoBridges blade if:

- The license's expiry time is extended or becomes permanent. For example the expiry date is September and there is an extension until November.
- The license adds features of an already existing feature. For example there is 120 voice processing features activated and the new license has 240 voice processing resources.

Restart the TelcoBridges blade if:

- The old license was already expired and an extended or permanent license is installed.
- There is a new feature added. For example adding more physical interfaces is in the new license, but not the old one.

12.4. Starting the TelcoBridges System-Blades

There are various ways to restart the blade:

- Use the restart command from the installation tool
- Use the restart message in the API (TB640_MSG_ID_ADAPTER_OP_RESTART)
- Type <reboot> at the serial or the console
- Hot swap the blade
- Restart the CompactPCI chassis
- When the blade is starting, the 8 Character Display will show "Booting", and before it's ready, it'll shows "LOAD1", "LOAD2"…"LOAD25" (The number depends on the software release) and then will continue to display User defined character in a rotational mode. The serial console and udplisten

log will show some output data. If something went wrong (for example wrong license file or package problem), you will see it appear there.

- The blade is now booted up and ready to be used

12.4.1. Verifying the blade status

To verify if the blade has started properly, you must access the blade.

To access the blade:

1. At the serial or console port, type “print_boot” command and verify which version the blade is running.
2. Run the tb640debug program (/tb/bin/<buildtype><processor>-<os/arch>/tb640debug). and select the Blade. This will create a file with information about the system. You can verify if everything is allright.
3. To verify if the physical interfaces are connected properly, the tbshowls sample program (/tb/bin/<buildtype><processor>-<os/arch>/tbshowls) can also be used to configure the physical interfaces. tbshowls reads the status of the trunks, DS3 or STM-1 interfaces, and prints them to the screen.

Notes on access to the blades:

Programs will use first two Ethernet IP addresses available in the system. This selection is done following the same convention as Winpcap (Windows) and libpcap (Unix systems). If the selected IP addresses are not on the same physical Ethernet network and IP subnet, you must force the server to use the appropriate IP addresses:

- On the servers, set the environment variable TBX_GW_ADDRESS_0 and TBX_GW_ADDRESS_1 to the IP addresses of the servers needed to control the blades (must be the same subnet as eth0 and eth1 of the blades).
- Some applications have this integrated in configuration files and these values can be set there.

There is a maximum of 64 applications that can attach to the blades.

12.4.2. Verifying airflow

To verify if the airflow in the chassis is proper, the temperature sensors on the **TelcoB**ridges blades can be used. Three sensors are available to identify any hot points in a chassis. Use the tb640debug tool as described in section 14.1.3. Look for this information: “Zone1 temperature”, “Zone2 temperature”, “Zone3 temperature” and “Zone4 temperature”. The recommended operation is below 65 degrees C. In good CompactPCI chassis, the normal temperature is below 55 degrees C.

13. Sample compilation

13.1. Solaris, Linux and Windows (with Cygwin)

1. Start a bash shell
2. Go into the directory where the common package AND the OS-specific package where uncompressed.
3. Make sure that the user's PATH variable is able to reach application such as **make**, **cp**, **sed**, **etc**.
4. Make sure that the following environment variables are set:
   export MAKE_MODE = unix
5. If running on Windows (using cygwin), make sure that the following environment variables are also set:
   export MSVCDIR= C:\\PROGRA~1\\MICROS~4\\VC98[2]
6. To compile all libraries and samples, simply go to the /tb directory and do:
   make clean all
7. To compile all libraries and samples in debug (with symbols), do:
   make clean all DBG=1
8. To compile all libraries and samples for a sparc-64 machine, do:
   make clean all SPARC64=1
9. To compile all libraries and samples for a linux-64 machine, do:
   make clean all X86_64=1
10. Under Windows to generate Microsoft Visual Studio .DSP project files, if not already available, do:
    make dsp

13.2. Windows

We recommend using the '**Cygwin'** environment to compile under Windows. It is possible to compile the packages using Microsoft Visual Studio .DSP project files.

Using the GUI, simply go into the desired source directory, double-click on the .dsp file. The Msdev framework will automatically create an associated .dsw file. Using Visual Studio IDE, select 'rebuild all' to compile the sample.

From the command line, go into the desired source directory and type the following command:

msdev <dsp filename> /all /make /rebuild /norecurse

[2] Be sure to use the proper installation path of Microsoft Visual Studio

14. Problem report

14.1. How to report a problem

TelcoBridges has developed several tools to gather information about the system to solve the problem quickly.

- Tools must be setup at the beginning (udplisten log)
- Tools can be used before and after the problem is reproduced (tb640debug)

Some information cannot be received from the logs and need to be provided by the customer (Set Up Information).

Once information is gathered and sent to the support group (support@telcobridges.com), the support group will assign a tracking number to this problem. Every following e-mail/MSN/call should start by indicating which tracking number we are referring to.

The first objective is to find an immediate workaround for the problem and then, if necessary, fix the problem in a subsequent package release.

When a new package is released, the release notes (/tb/doc/tb640) will present all fixed tracking number. This way, you can verify if this release fixes the issue that concerns you.

The following items need to be contained in every problem reported:

14.1.1. Setup information (Mandatory)

Information must include:

- Physical connections (send a diagram if necessary)
- CompactPCI chassis used (manufacturer and model)
- Host controlling the blades (manufacturer, CPU type, memory, OS version and patch level, ethernet interfaces)
- TelcoBridges equipment used
- Ethernet network diagram (IP addresses, Ethernet switches used, etc)
- Telecommunication connectivity diagram (E1, DS3, STM-1, VoIP Ethernet switch. etc)
- Adapters from other vendors used in same chassis
- Application description
- If it is a signaling problem, specify which side is initiating the call.

For a particular development cycle, some of this information will not change and can be provided only once. Please advise if any of this information change.

14.1.2. Udplisten log (Mandatory)

The udplisten log should be gathering information at all times when developing the application and also in a live system. This way we can identify a problem even if it occurred in the past.

To set it up, see section Set debug output target system and trace level. When any problem is found, please attach the udplisten log output to the problem report.

14.1.3. tb640debug dump (Mandatory)

The tb640debug copies information about the library and one blade onto a file. This includes software release running on the host, the firmware release running on the blade, blade information, features available, configuration, status, etc.

When a problem is reported, you must attach the tb640debug file.

If the problem is reproducible, we will need a tb640debug dump before and after the problem is reproduced. This can help identifying the problem fast.

tb640debug comes as a sample (tb640/samples/tb640debug) and a compiled executable (tb640/tools/tb640debug).

14.1.4. Console commands

Console commands are additional commands that can be made to the blades directly. The commands can be used in particular cases. The support group will tell which commands are necessary depending on the problem encountered.

14.1.4.1. Steps for console commands

i. Ping Both IP addresses (Eth0 and Eth1)
ii. Telnet on Eth0 IP address and execute commands below
iii. Telnet on Eth1 IP address and execute commands below. If Eth1 is not available, execute command “cpu1” and then execute commands below (ctrl-c to exit from cpu1 shell)
iv. Paste output to a file and send to the support group

14.1.4.2. Typical Console Commands

Console commands are case sensitive. Here are a few useful commands:

print_boot	shows the release the system is using, the IP addresses and the boot information
rtc_date	Local real time clock date
rtc_time	Local real time clock time
print_debug	logs destination IP addresses and UDP port (udplisten) and trace levels
bspversion	Version of firmware
hwStats ALL	Hardware status
proclist	Process build time
ps	Process list
ethlink	Information about the Ethernet link
ethlinkstats	Ethernet Statistics
rld –a	ramlog from previous reboots
strings	Print trace buffer

14.1.5. ISDN/SS7/SIP/H.324M traces

To get a trace of all signaling messages you can use the tb640sim tool. To use this you must configure the <simscript.txt> file to capture trace about one or multiple links. Using this tool adds loading to a system and should be used only if necessary. Note: When doing stress testing, the files tend to get quite large.

When using ISDN, you must use the Q921ANALYZER command and specify the trunk and it will dump to a file the parsed Q.921 messages (timeslot 23 for T1 and timeslot 16 for an E1).

When using SS7, you must use the SS7ANALYZER command and specify the trunk and the timeslot(s) to be selected and the parsed MTP2/MTP3/ISUP messages will be dumped in a file.

When using SIP, you must use the TUCLANALYZER command and specify the Ethernet interface to monitor, which UDP port (default 5060) and the parsed SIP messages will be dumped in a file.

When using H324M, you must use the H223ANALYZER command and specify the trunk and the timeslot(s) to be selected and the parsed H223 messages will be dumped in a file.

FORMAT parameter will parse the messages into a file. Another option is to use the the TEXT2PCAP parameter. This will generate a file, which can be converted to pcap format using the text2pcap.exe program found in the Wireshark, or ethereal program (http//www.wireshark.org):

text2pcap -t %H:%M:%S. -l 139 [input file] [output file]

Wireshark can then be used to parse the output file.

14.1.6. Other useful tools

Other tools useful for debugging:

- tbshowls reads the status of the trunks, DS3 or STM-1 interfaces, and prints them to the screen. It can also configure the physical interfaces. Available in both sample and tool format.

14.2. Access to the system

Sometimes, to gather supplemental information or to speed-up the debugging process, the support group will ask for access to the host controlling the **TelcoB**ridges blades or access to the blades directly. Once access is achieved, debugging process can continue until the problem is identified.

14.3. Known issues with third-party software

Using external software can affect system performance.

14.3.1. RealVNC (http://www.realvnc.com/)

This is a remote access software. We recommend using a dual CPU host and independent Ethernet interface for management (RealVNC)

14.3.2. Veritas (http://www.veritas.com/)

The Veritas Cluster Server for High Availability solution requires some settings on the host controlling the TB system. We recommend using independent Ethernet interfaces for Veritas heartbeat and other features.

14.3.3. HP IP teaming http://h18004.www1.hp.com/products/servers/networking/teaming.html)

We recommend using independent Ethernet interfaces for HP IP teaming since TelcoBridges products support their own Ethernet redundancy scheme.

15. Annex I Cable and Connector Pinouts

Connect the SCSI-3 (HD68) cables to the TB-Video rear panel (see **Error! Reference source not found.**). Connect the SCSI-3 cables on the RJ-48 patch box. Each RJ-48 patch box supports 32 trunks and eight (8) line interfaces (E1/T1/J1). The patch boxes are either RJ-48T or RJ-48M (ANSI T1.403 compliant).

TelcoBridges Patch Panel for TB640 adapters

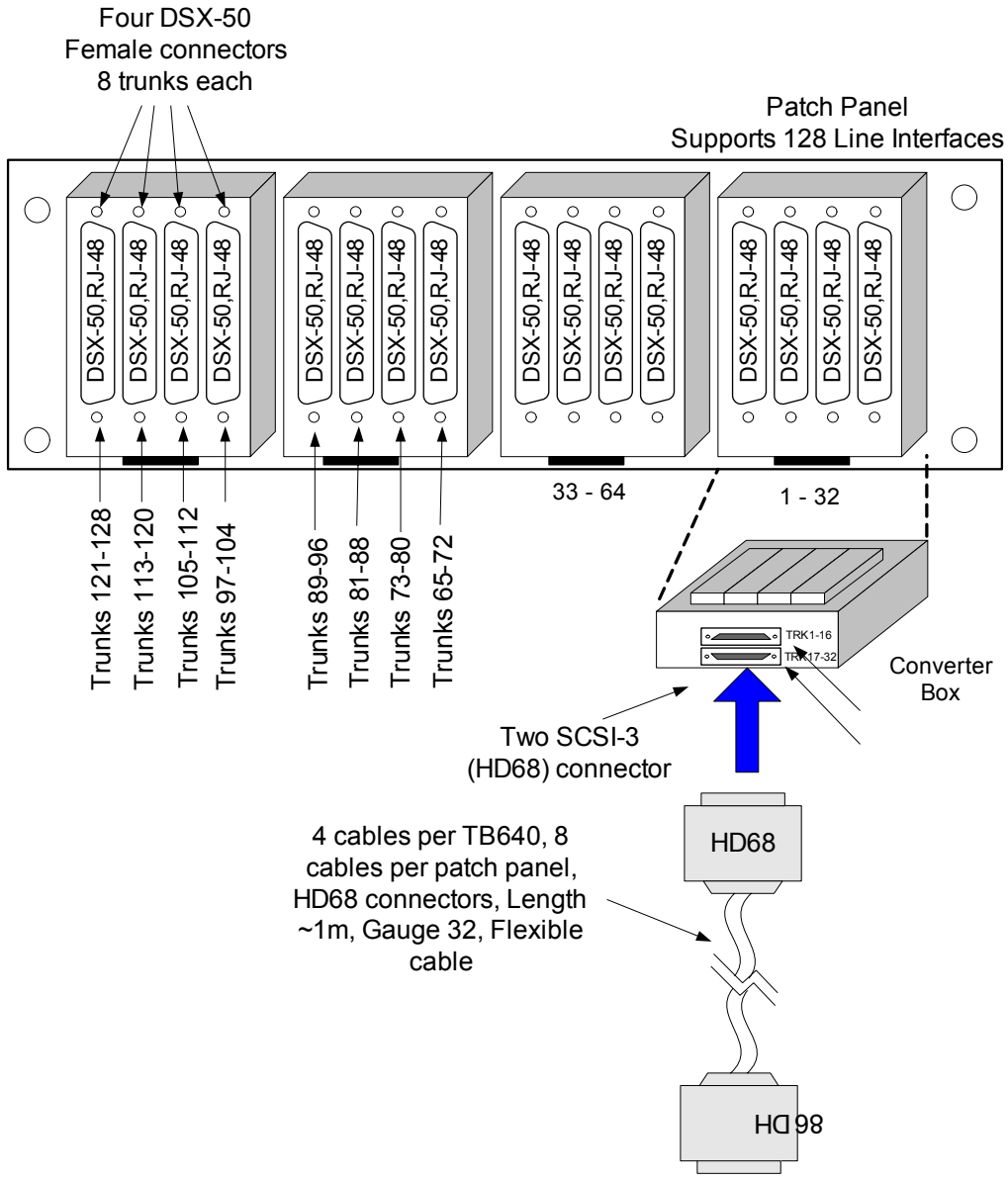


Figure 19 TB640-128 Trunks patch panel

Two versions of the RJ-48 (DSX-50) connectors are available. The RJ-48M version is ANSI-T1.403 compliant (Box-32-ITU) while the RJ-48T version is compatible with some other CompactPCI board vendors on the market (Box-32-RJ48T).

Individual Converter Box Pin out			Pin out of RJ-48M connectors			
Converter Box	RJ-48M connector	**Trunks**	Tx (Tip)	Tx (Ring)	Rx (Tip)	Rx (Ring)
Trunk 1-16	Connector 1-8	**1**	27	2	26	1
(Trunk 33-48)	(Connector 33-40)	**2**	30	5	29	4
		3	33	8	32	7
		4	36	11	35	10
		5	39	14	38	13
		6	42	17	41	16
		7	45	20	44	19
		8	48	23	47	22
	Connector 9-16	**9**	27	2	26	1
	(Connector 41-48)	**10**	30	5	29	4
		11	33	8	32	7
		12	36	11	35	10
		13	39	14	38	13
		14	42	17	41	16
		15	45	20	44	19
		16	48	23	47	22
Trunk 17-32	Connector 17-24	**17**	27	2	26	1
(Trunk 49-64)	(Connector 49-56)	**18**	30	5	29	4
		19	33	8	32	7
		20	36	11	35	10
		21	39	14	38	13
		22	42	17	41	16
		23	45	20	44	19
		24	48	23	47	22
	Connector 25-32	**25**	27	2	26	1
	(Connector 57-64)	**26**	30	5	29	4
		27	33	8	32	7
		28	36	11	35	10
		29	39	14	38	13
		30	42	17	41	16
		31	45	20	44	19
		32	48	23	47	22

Table 9 RJ-48M Patch Box Pin out (Box-32-ITU)

Individual Converter Box Pin out			Pin out of RJ-48T connectors			
Converter Box	RJ-48T connector	**Trunks**	Tx (Tip)	Tx (Ring)	Rx (Tip)	Rx (Ring)
Trunk 1-16	Connector 1-8	**1**	26	1	27	2
(Trunk 33-48)	(Connector 33-40)	**2**	28	3	29	4
		3	30	5	31	6
		4	32	7	33	8
		5	34	9	35	10
		6	36	11	37	12
		7	38	13	39	14
		8	40	15	41	16
	Connector 9-16	**9**	26	1	27	2
	(Connector 41-48)	**10**	28	3	29	4
		11	30	5	31	6
		12	32	7	33	8
		13	34	9	35	10
		14	36	11	37	12
		15	38	13	39	14
		16	40	15	41	16
Trunk 17-32	Connector 17-24	**17**	26	1	27	2
(Trunk 49-64)	(Connector 49-56)	**18**	28	3	29	4
		19	30	5	31	6
		20	32	7	33	8
		21	34	9	35	10
		22	36	11	37	12
		23	38	13	39	14
		24	40	15	41	16
	Connector 25-32	**25**	26	1	27	2
	(Connector 57-64)	**26**	28	3	29	4
		27	30	5	31	6
		28	32	7	33	8
		29	34	9	35	10
		30	36	11	37	12
		31	38	13	39	14
		32	40	15	41	16

Table 10 RJ-48T Patch Box Pinout (Box-32-RJ48T)

16. Annex II Patch Panel Connectors

Each patch panel support up to 32 trunks.

Figure 20 RJ-45 Patch panel front view

Figure 21 RJ-45. Patch panel rear view

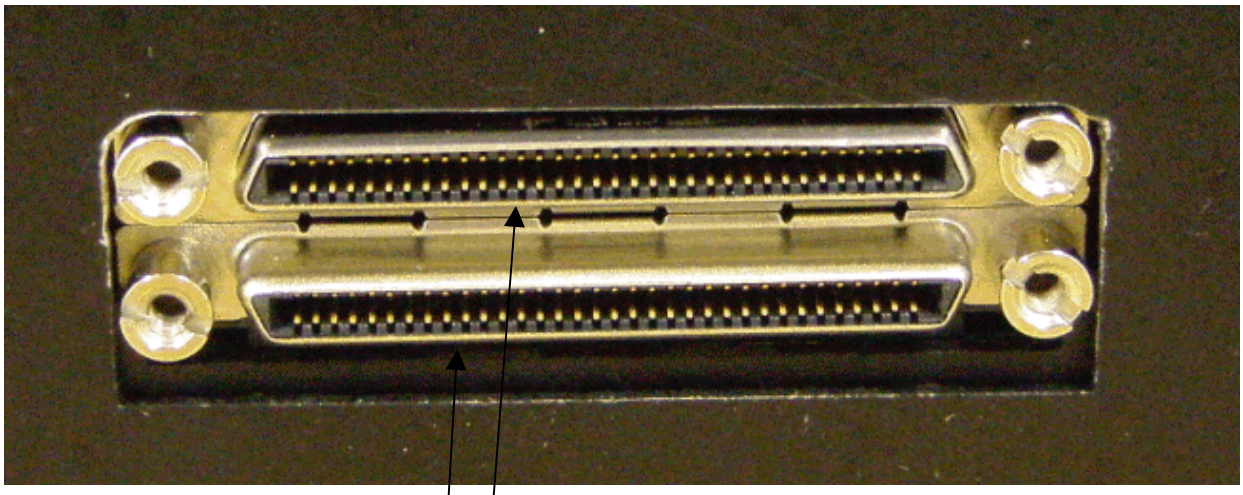
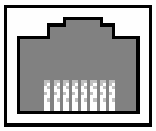


Figure 22 Patch panel SCSI-3 connector

Connector front view



8 1

Pin number	Description
1	Rx Ring
2	Rx Tip
3	Not connected
4	Tx Ring
5	Tx Tip
6	Not connected -
7	Not connected
8	Not connected

Table 11 RJ-45 (RJ-48) E1/T1/J1

Upper Row	**TB640 Trunk**	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	Trunk Label on First Patch Panel	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Lower Row	**TB640 Trunk**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Trunk Label on First Patch Panel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

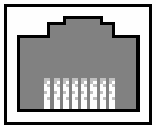
First patch panel, trunks 1 to 32

Upper Row	**TB640 Trunk**	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
	Trunk Label on Second Patch Panel	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Lower Row	**TB640 Trunk**	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	Trunk Label on Second Patch Panel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Second patch panel, trunks 33 to 64

17. Annexe III Ethernet RJ-45 Pinout

Connector front view



8 1

Pin number	Description
1	Bi-directional pair A+
2	Bi-directional pair A-
3	Bi-directional pair B+
4	Bi-directional pair C+
5	Bi-directional pair C-
6	Bi-directional pair B-
7	Bi-directional pair D+
8	Bi-directional pair D-

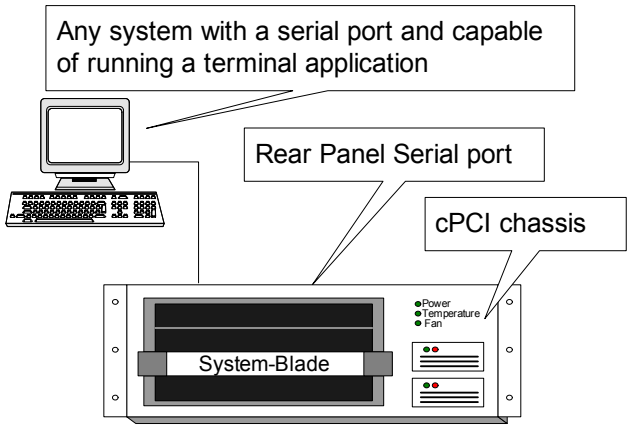
Table 12 Ethernet RJ-45 pinout

18. Annexe IV DB-9 Serial Pinout

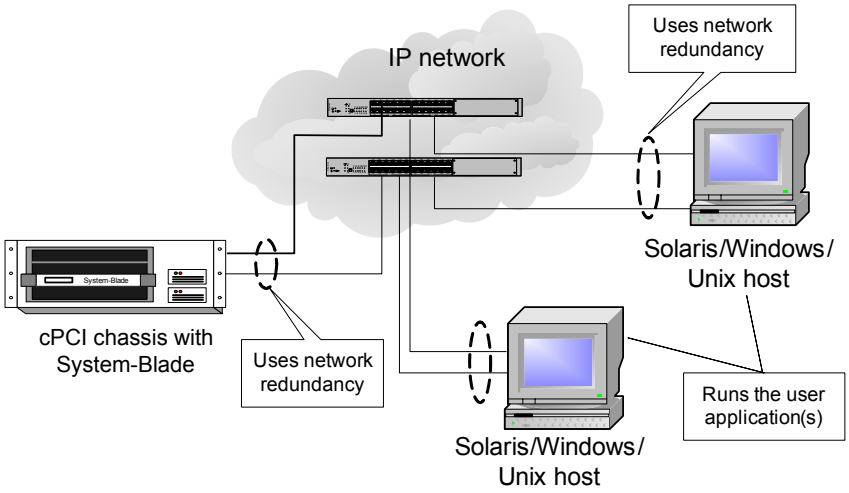
Pin	**Signal**
1	n/c
2	Rx
3	Tx
4	n/c
5	Ground
6	n/c
7	n/c
8	n/c
9	n/c

Table 13 DB-9 Serial pinout

19. Annex V Serial Cable to TelcoBridges System-Blade



20. Annex VI Ethernet Connection to TelcoBridges System-Blades



21. Annex VII TB-VoIP Mezzanine + Procedure

Note The TB-VoIP Mezzanine includes the TB-Multi-Blade feature. Each TB-VoIP Mezzanine is equipped with four TB-Multi-Blade connectors and two gigabit Ethernet VoIP connectors (found on a single physical connector micro DB-25 female connector.) Only one of the VoIP connectors is active. The second is reserved for future use.

1. If using the TB-Multi-Blade option with the TB-VoIP Mezzanine see TB-Multi-Blade Hardware Installation for installation procedure.

Note The TB-VoIP Mezzanine ships with a DB-25 male to Ethernet cable.

Figure 23 Cable shipped with the TB-VoIP Mezzanine

2. Connect the DB-25 cable to the TB-VoIP Mezzanine option of your system-blade.
3. Connect the Ethernet cable to ETH1 of the TB-VoIP Mezzanine cable

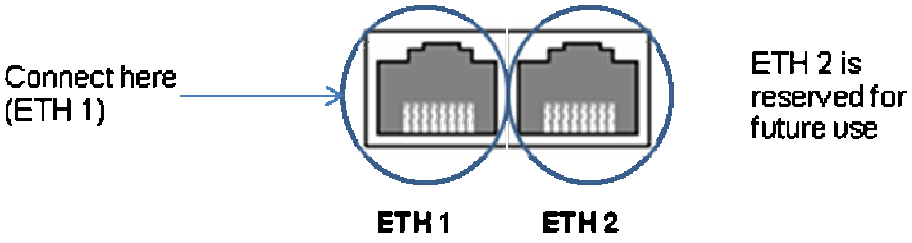


Figure 24 TB-VoIP Mezzanine Ethernet cable connectors

