

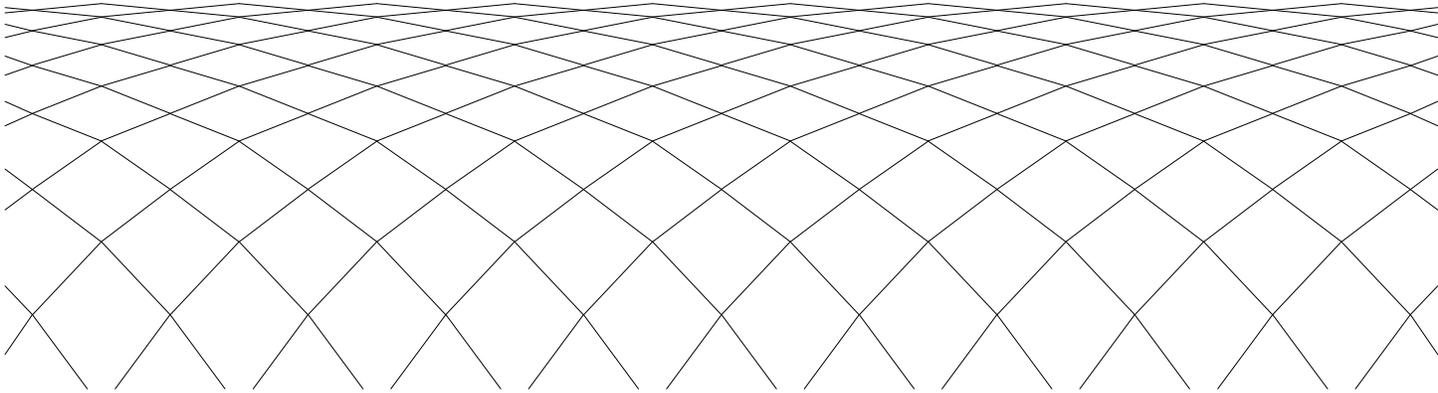


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# **AT&T Product Interfaces**

## Reference

SYSTEM 75 R1V3 TO 551 CSU





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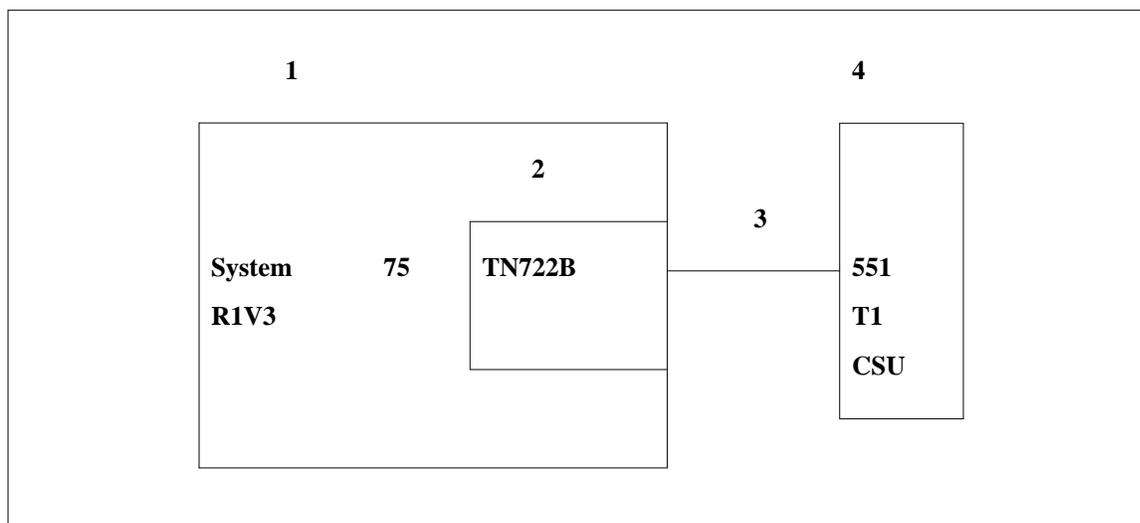


## SYSTEM 75 R1V3 TO 551 CSU

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### CONFIGURATION



### REQUIRED EQUIPMENT

1. System 75 R1V3 PBX (PEC 6300-03A).
2. TN722B circuit pack (PEC 63122-03A), located in any slot.
3. Group 380 or group 357 PBX-to-channel service unit (CSU) cable. The connector for this cable should be loose in the bag on the CSU side and must be installed. The group 380G cable is the latest cable being shipped for this interface, but the 357G should work also. Do not return the 357G for a 380G. Any other cables are non-standard and should not be used. The plug, hood, and slide for the CSU-end of this cable are shipped loose and must be installed. You might need a crimping tool to install the most recent versions of these connectors.
4. 551 T1 CSU (PEC 2152-15T). The CSU should come with two printed circuit boards: the office repeater and the signal monitor. If the local facility provider requires it, an optional fault location filter must be ordered (PEC 21526).
  - The CSU is a rack-mounted device but very often the rack is not ordered with it.
  - Two versions of this CSU have been shipped. The most recent version has ears allowing adaptation to either 19 in. or 23 in. racks.
  - The old version takes only a 23 in. rack.

- You might be able to use space in an existing Audio Information Exchange (AUDIX) rack, System 85 auxiliary cabinet rack, or some other similar rack.
  - Do not try to build a rack and do not set the unit on anything other than a rack.
  - The new version referred to above IS NOT the 551 extended superframe format (ESF), which is a completely different CSU. See the interface descriptions for System 75 and System 85 to the 551 ESF and the 551 ESF to facilities for more details of this CSU.
5. CSU-to-Local Exchange cable. This cable is not provided in the order.
- No standard cable exists, so you must find a suitable cable.
  - The length of the cable will not be known until the facility provider (local exchange) installs their interface. The maximum length is 3000 ft from the CSU to the first repeater on the facility side of the interface, or to another CSU. See *AT&T DS1/DMI Interface Service Manual* page 31 for these distance limitations.
  - The cable from the CSU to the facility interface must meet certain requirements to avoid crosstalk and noise. The cable must contain individually shielded pairs.
  - Standard building wiring can also be used. If this is done, two separate cables should be used, one for the transmit pair and one for the receive pair. All unused pairs in each cable should be grounded. Also, transmit and receive pairs should not be connected close to each other in terminal blocks.
  - The recommended cable is a Belden 8450 or equivalent. Refer to *T1 Digital Line Transmission and Outside Plant Design Procedures Carrier Engineering* for shielding requirements.
  - The new 551 ESF CSU is shipped with several optional CSU-to-facility interface cables. You might be able to use one of these cables, probably the 15-pin-to-raw-ended cable, for this application.

## Required Software

No special software patches or loads are needed to make this interface work properly.

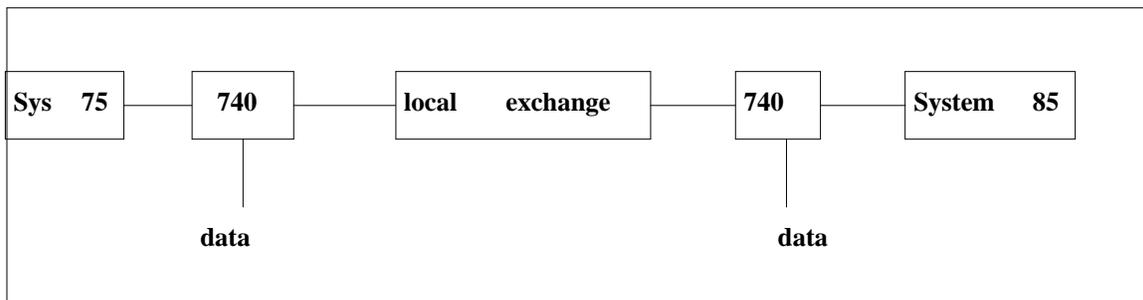
## APPLICATION

This configuration is used when connecting the System 75 to the local exchange telephone company via T1 facilities. It can be used for the following applications of either voice or data:

- Connect the System 75 to another PBX over T1 facilities with tandem tie trunks, main/satellite tie trunks, electronic tandem network (ETN) tie trunks, or distributed communication system (DCS) using DS1 tie trunk.
- Connect the System 75 to the 4 ESS™ for access to MEGACOM®, MEGACOM® 800, ACCUNET® Switched 56, Software Defined Network, and other AT&T nodal services.

If the economics of the situation dictate that the local exchange should not be used, then the CSU can be eliminated. The PBX can be tied to other equipment by several other means, as follows:

- The System 75 can be connected to another System 85 or a System 75 directly if they are within 1310 ft of each other, negating the need for the CSU.
- A System 75 can be connected via a fiber interface between the the DS1 circuit pack and the corresponding interface on other equipment with virtually no distance limitations. This application does not use the CSU or local exchange but it does often encounter right-of-way problems.
- The System 75 can connect to other DS1 equipment using two 740/741 Multiplexers. Since the 740 has the option of a built-in CSU, this configuration also eliminates the need for the CSU. Furthermore, individual DS0 time slots can be split off for specific data applications as follows:



See the interface descriptions *System 85 to 740 Multiplexer*, *System 75 to 740 Multiplexer*, and *740 Multiplexer to 740 Multiplexer*.

- The System 75 can be connected to other compatible equipment via DR23 microwave units. This application negates the need for the local exchange and the CSU. It also gets around the right-of-way problem associated with the fiber interface. See the interface descriptions *System 85 to DR23*, and *System 75 to DR23*.

## CABLING REQUIREMENTS

### System 75 to CSU

- The maximum distance between the System 75 and the 551 T1 CSU is 85 ft. This particular CSU has this limit due to limits in its terminating repeater. The distance to other types of CSUs, including the new 551 ESF CSU, may be up to 655 ft.
- You must install the connector on the CSU end. Install this connector to match the J1 15 pin D-subminiature connector on the back of the CSU as shown on page 7 of *551 T1 Channel Service Unit User's Manual*. The color codes for transmit and receive pairs were changed from group 357 to group 380. The group 380 color codes and other necessary information can be found in the November, 1987 and April 1988 *NTO Technical Monthly*.
- The cable shield is NOT grounded at the System 75. Thus, you must ground the shield at the CSU. If grounded at both ends, the shield acts as an antenna.

## PARAMETER SETTINGS

Several switches must be set on the CSU. The System 75 has several parameters that must be set through administration.

### CSU Hardware Switch Settings

The following options must be set correctly on the CSU:

- Local or line powering
- Artificial line
- Signal monitor option

### Setting the Power Option

If you have measured 130V or -130V on any of the wires, option the CSU for line power as shown on page 15 of *551 T1 Channel Service Unit User's Manual*.

If you measured -48V and 0V, connect the CSU and measure for a 60 milliamp current. If the current is less than 60 milliamps, option the CSU for local power only as shown on page 15 of *551 T1 Channel Service Unit User's Manual*.

If you measure 0V on all wires and you have verified that a T1 signal is present, option the CSU for local power plus sealing current as shown on page 15 of *551 T1 Channel Service Unit User's Manual*.

### Setting the Artificial Line Option

To set this option, you ideally should know the distance to the first line repeater. This information is usually not available. You can try asking the facility provider for the distance range to the first repeater. If this does not work, you can set the option for 7.5 dB, which will usually work. The only other alternative is to test for the T1 signal level. Using a Phoenix 5575 or equivalent T1 test set, measure the T1 signal.

- If the T1 signal measures greater than 3V or less than .1V it is out of range and the CSU cannot be optioned. In this case, the customer must negotiate with the facility provider to get the signal within range.
- If the reading is between 2.8V and 3V, option the CSU for 15 dB as shown on page 15 of *551 T1 Channel Service Unit User's Manual*.
- If the reading is between 1V and 2.8V, option for 7.5 dB.
- If the reading is between .3V and 1V, option for 0 dB.

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## Setting the Signal Monitor Options

Set the signal monitor option for ONES, ZEROES, and ACTIVE FAULT LOCATE as shown on page 13 of *551 T1 Channel Service Unit User's Manual*.

## ADMINISTRATION SETTINGS

The System 75 has a series of administrations that must be performed. Follow the procedures found on pages 90-97 of the *AT&T System 75 and System 85 DS1/DMI Interface Service Manual*. These procedures tell you how to administer the System 75 in general for a T1 interface. In addition, consider the following recommendations:

- The options chosen on the System 75 must agree with the options chosen on the far-end equipment.
- Option the System 75 for ESF format. Make sure that the T1 facility order form designates this. If you administer the switch for ESF and the T1 facility provider does not know this, they might connect the trunk to equipment incompatible with ESF. This code is ESF in the System 75.
- If the application for this trunk is mainly for data communications, option the System 75 and the far-end for 24th channel signaling.
- If the application for this tie trunk is mainly for voice communications, option the System 75 and the far-end for robbed bit signaling.
- Do not attempt to administer the System 75 Synchronization Options unless the complete, end-to-end configuration has been engineered by the Regional Engineering Center (REC) and there is a synchronization plan on site. Attempting to synchronize a PBX without knowing the complete synchronization plan for what might be a large network can cause many problems.
- If you administer the System 75 for 24th channel signaling, then also administer it for Alternate Voice Data (AVD).

## TRANSMISSION REQUIREMENTS

A standard exists for all PBX transmission requirements. See the "Transmission Parameters" section of the *SP-1378 Private Branch Exchange (PBX) Switching Equipment for Voiceband Applications, Proposed Revisions to RS-464 and RS-464-1*. Some transmission requirements can also be found in the "The Digital Loss Plan" section of the *AT&T DS1/DMI Interface Service Manual*.

The primary transmission requirements you will need to know for this interface are the port-to-port insertion loss criteria and the line error rates. The port-to-port loss criteria can be found in a table in the RS464 standards manual and, to a lesser degree, in the DS1/DMI manual. Error rate information can be found by monitoring the number of slips in the System 75.

## **Physical Layer Protocol**

The physical layer protocol for this interface is best described as 4 wire with E&M (two state) signaling multiplexed onto a DS1 signal carried by a T1 transmission facility.

## **High Level Protocols**

No link-layer or higher layer protocols apply to this interface.

## **TESTING**

The following tests should be performed before or at turnup of the MEGACOM Service circuit:

- The local exchange company should test the circuit from the facility interface at the customer's premises to the AT&T point of presence (POP). After the circuit is verified to be acceptable, it is turned over to AT&T.
- AT&T should perform an end-to-end error test on the circuit from the 4 ESS to the CSU. After this test passes, the circuit is turned up.
- After the circuit is first turned up, the premises technician should check that all alarms clear properly and that the System 75 synchronizes correctly. If an unusually high number of slips are occurring, the problem might be errors in the line or synchronization problems.
- The premises technician should perform a transmission test by sending and receiving a one milliwatt tone. Call the 4 ESS office to find the number for this tone. Use an HP 4935 or equivalent transmission measuring set capable of supplying a DC holding bridge. Send a 1 milliwatt tone from a station on the System 75 to the 4 ESS and receive this tone back from the 4 ESS. Verify that the loss is in the correct range as stated in the standard. If the loss is out of range, call Tier III. At times you may need to work with the 4 ESS Trunk Operations Center (TOC) personnel to determine where the transmission is out of range.
- The premises technician should verify that MEGACOM Service calls can complete on all trunks that might be used.
- The 4 ESS personnel should verify that MEGACOM 800 Service calls can complete on all trunks that might be used.

## **UPGRADE REQUIREMENTS**

### **System 75 Upgrade**

If you are upgrading to R1V3 from R1V2, you should change the administration slightly.

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## CSU Upgrade

If you upgrade the 551 CSU to the new 551 ESF CSU, see the interface descriptions *551 ESF CSU to T1 Facility* and *System 85 R2V4 to 551 ESF CSU* for changes in the CSU interface requirements.

## USER INTERFACE REQUIREMENTS

The user interface depends on the application. This interface is transparent to the user.

## PEOPLE INTERACTIONS

- You (the premises technician) should, at the earliest possible time, obtain the following records and paste them up permanently on the CSU. You should be able to get these records from the account team, probably the system consultant (SC, formerly technical consultant, or TC) when the order goes in:
  - A copy of the T1 order form for the service.
  - A table mapping each System 85 DS0 channel used for the T1 service to the AT&T Private Line Circuit ID. Without this mapping, it is very difficult for the AT&T communications maintenance technicians or engineers to troubleshoot faulty circuits.
  - Type of access. Either customer-provided, AT&T ACCUNET T1.5, or Local Exchange-provided.
  - The phone number of the Customer Service Center (CSC) or Special Service Center (SSC) to which you should call when a problem occurs.
- When a problem occurs in a T1 trunk, do not immediately try to fix it in the System 85. The first thing you should do is call the designated CSC/SSC. This AT&T communications office has overall responsibility for the procedures involved in fixing the trunk.
- If you suspect the problem is in the System 85, let the technician at the CSC/SSC know what you know and it might expedite fixing the problem.
- The CSC/SSC will test the circuit from the facility side. If they think the problem lies in the System 85 or other premises equipment, they will call the Customer Service Support Organization (CSSO) in the region, who will eventually get back to you. At this point, you might try re-administering the System 85 or perform other actions in coordination with the CSSO and the CSC/SSC.

Marketing personnel must communicate with one of the RECs or the National Engineering Center (NEC) to have a synchronization plan developed. If this required step is not taken, many problems will develop in the future when attempting to maintain or modify the system. Furthermore, a technician should not attempt to fix a DS1 synchronization problem unless a synchronization plan is present at the PBX site. Synchronization problems should be escalated unless a sync plan is present.

The equipment the trunk connects to in the local exchange can be important. When engineering the DS1 network associated with the configuration described in this description, the REC engineers should attempt to identify the equipment in the local exchange.

## REFERENCES

See the *Product Integration Roadmap* for a complete set of references related to each interface.

1. *AT&T DS1/DMI Interface Service Manual*, Issue 2, July 1987, Select Code 555-025-101.
2. *T1 Digital Line Transmission and Outside Plant Design Procedures Carrier Engineering AT&T Practice 855-351-101 Issue 8*, January 1987.
3. *551 T1 Channel Service Unit User's Manual*, Issue 1, March 1985, 999-100-189IS.
4. *NTO Technical Monthly*, November 1987, April 1988.
5. *SP-1378 Private Branch Exchange (PBX) Switching Equipment for Voiceband Applications, Proposed Revisions to RS-464 and RS-464-1*. This document might not yet be available.

Many of these documents are available from the AT&T Customer Information Center (CIC). To obtain copies of these documents, write to:

AT&T Customer Information Center  
Attn: Customer Service Representative  
P.O. Box 19901  
Indianapolis, IN 46219

Or call: 1-800-432-6600

Specify both the title and the ordering number.

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