

Linkbit Anytest Handbook Addendum

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1. Introduction

This document has grown out of our experience with the Linkbit Anytest E1 card in certain testing scenarios. It shall prove as an addendum to the documentation delivered with the product, it is not and will never be a replacement. We focus on practical issues extending beyond the scope of the reference manual. Please note, that BDD also offers additional products and services as a supplement to Linkbit Anytest. For more information refer to our website <http://www.telecomm.at>.

As the following text covers certain products, please note, that Linkbit Anytest is a trademark of Linkbit, Inc. and that all mentioned AVAYA products are trademarks of AVAYA World Services, Inc.

2. Testing with AVAYA Components (ISDN)

The following section illustrates the use of Linkbit Anytest E1 with one of the following

- Avaya Definity Enterprise Communication Server R4 to R11 and above (also known as Definity Server)
- Avaya Media Servers S8100, S8300 and S8700

2.1. Step 1 - Locate the trunk board

First of all, locate the position of the DS1 circuit pack (e.g. TN464, TN2464) the trunk is connected to. From now on this side of the trunk will be called *near end*, whereas the other side is referred to as *far end*. By following the trunk wires, one has to identify cabinet, port network and board location, e.g. 01A16. Note the position, as it will be required during step 2 and 3.

2.2. Step 2 - Interconnect E1 card with DS1 card

In order to interconnect the Anytest Linkbit E1 card with the DS1 circuit pack, you have to isolate the point of measurement first. Some smaller equipment might provide RJ45 connectors on the front, but for the majority of AVAYA systems you have to turn to the backside and check the connectors (50 pin). In some cases, 50-pin AVAYA to RJ45 adapters are used to break out the relevant TRANSMIT and RECEIVE pairs to standard E1 cables. In other cases, you have to follow the cable (50 wires) to the main distribution field (usually Systimax). Either you continue to follow the line until a RJ45 connector is found or you adapt the wiring of the main distribution field by adding an additional test connection. In that case, the RJ45 "Y" 4 ALG cable (or simply "croco connectors") might be of use. If you detect a RJ45 connection, the modular adapter in combination with the RJ45 "Y" 4 ALG cable is the right choice. Please be aware, that any operation on the original wiring might result in disruption of service.

If concerned with single pairs for TRANSMIT and RECEIVE, just wire them to pins 1/2 (Tx) and 4/5 (Rx) of your modular adapter and / or RJ45 "Y" 4 ALG cable. As an example take the setup shown in figure 2.1. Be cautious to keep the pairs intact, interchanging leads within pairs does not matter. If pairs as a whole are interchanged, they may be swapped by software command later in the line setup of the Linkbit Anytest application.

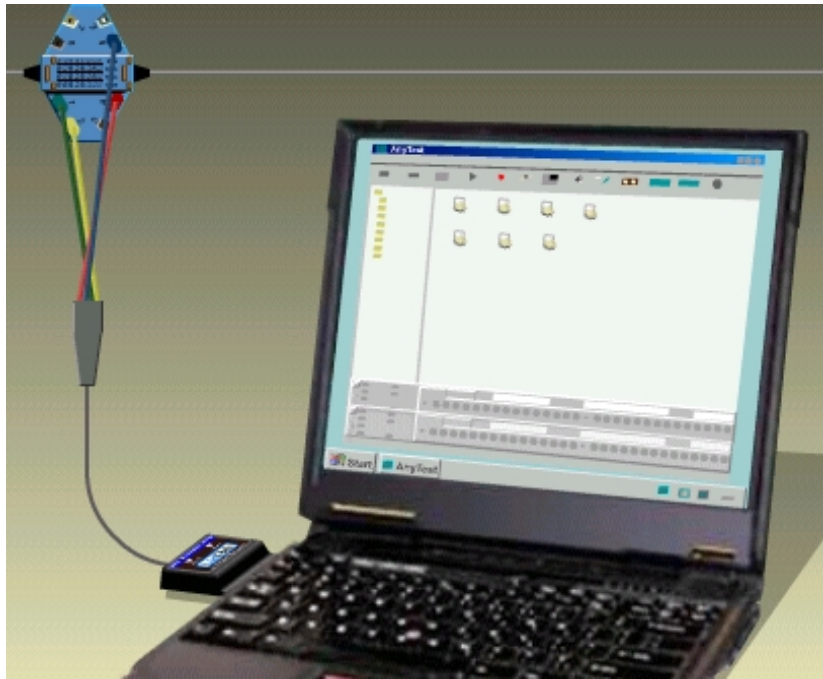


Figure 2.1: Typical E1 measurement configuration

```

display ds1 01a16                                     SPE R
DS1 CIRCUIT PACK

Location: 01A16                                     Name:
Bit Rate: 2.048                                     Line Coding: hdb3

Signaling Mode: isdn-pri
Connect: pbx

Interface Companding: alaw
Idle Code: 01010100

Country Protocol: etsi
Protocol Version: a
CRC? y

DCP/Analog Bearer Capability: 3.1kHz

Slip Detection? y                                  Near-end CSU Type: other

Define ISDN tie trunk
with ETSI signaling
(side a)

```

Figure 2.2: Example showing a Definity tie trunk setup (DS1 mask)

2.3. Step 3 - Identify trunk setup

Log on to the AVAYA system hosting the DS1 circuit pack and enter the following command: `display ds1 <location>`, in our example this would be `display ds1 01A16`. Screen output should be similar to that shown in figure 2.2. If the command has been refused, you either did not enter the location properly or you don't have the required access permissions. In the first case proceed with Step 1, for the latter contact your AVAYA service partner for assistance. From the DS1 mask, identify **Signaling Mode**, **Bit Rate**, **Line Coding**, **Connect**, **Interface**, **Country Protocol**, **Protocol Version**, **CRC** and **Interface Companding**. For a typical E1 setup, the bit rate should be 2.048 Mbps. The example in figure 2.2 shows a typical ISDN tie trunk setup (parameter **Connect** set to "pbx"). In such a setting synchronisation may be provided by the near or the far end. According to the parameters **Connect** and **Interface** you have to determine the System Clock Source setting in Anytest Line Setup. In the current example the switch hosting the DS1 board under test provides the network synchronisation to the far end (parameter **Interface** set to "network"). As a consequence System Clock

SIGNALING GROUP

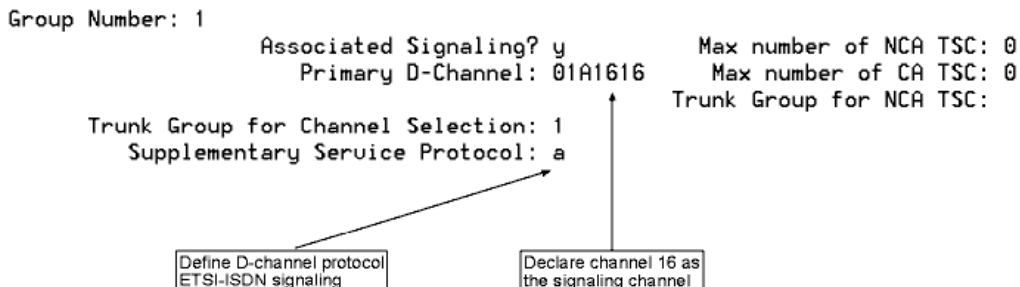


Figure 2.3: Typical signaling group setting for a tie trunk

Source in Anytest Line Setup has to be set to "Rx Line A". The synchronisation for non tie trunks is derived directly from the parameter **Connect**. Synchronisation for "line-side" interfaces is provided by the near end, whereas "network" attached trunks are typically synchronized to the public network (providing a Stratum 3 clock signal). Please note, that misconfiguration of the clock signal might cause service disruption. On the Line tab of Anytest Line Setup select the appropriate Signaling Type, in our example this would be "ETSI PRI (DSS1)". If the **Country Protocol** in the DS1 Circuit Pack form is different from "etsi", a selection of "5ESS" might be the right choice (especially if **Country Protocol** has been set to "1" for USA). For more information on country protocols, please refer to the *DEFINITY Communications System Generic 2.2 and Generic 3 V2 DS1/CEPT1/ISDN PRI Reference* [1]. If **CRC** has been set to "y" on the DS1 Circuit Pack form, you should also check the CRC box on the Line tab of Anytest Line Setup. Furthermore Line Coding and Companding have to be defined in a similar way. Please note, that Companding Rule Choice is a feature, which might have to be enabled for your Anytest E1 card. You can check availability of features by choosing Tools / Card Info from your Anytest main menu.

As a next step, enter the command `display signaling-group <sig>` (In case you do not know the corresponding signaling group, first enter `list sig` and browse through the list, until you have found an entry related to the DS1 circuit pack under test). In our example we have entered the command `display signaling-group 1` and received the output shown in figure 2.3. First of all, locate the entry for **Associated Signaling** on the top of the form. If it has been set to "y", the Frame Structure entry on the Line tab of Anytest Line Setup has to be configured for "2 Frames (FAS)". In order to define the D-Channel refer to the last two digits of the **Primary D-Channel** item in the signaling group form. The **Supplementary Service Protocol** setting does have a slight impact on the messages sent across the link under test. Now all parameters for the Anytest Line Setup have been defined and the configuration may be saved under a new name.

2.4. Step 4 - Configure and start trace

You can now turn to the configuration of Trace Setup, connect the RJ45 plug of the Bantam Adapter Cable to your Anytest E1 card, activate line setup and start the trace (or call generation / simulation). Please note, that for call generation / simulation you might have to specify additional parameters according to your lab setup.

In a typical monitoring setup be advised to consider the trunk forms as well, as they offer valuable information on the codesets, messages and information elements used for the link under test.

2.5. Front panel connectors for AVAYA DS1 circuit packs

Each AVAYA DS1 circuit pack also features 6 front side jacks to connect test equipment via Bantam Connector cables (also delivered with the Anytest Linkbit E1 card). We recommend **not to use** these connectors for monitoring, as some of them provide signals with different signal level and impedance. For sake of completeness we've included a description of the DS1 front panel connectors in this document.

According to the desired test setup you have to connect the Bantam Connector cable to the corresponding jacks of the DS1 card

- SM / EM - passive monitoring of the incoming / outgoing line (marked RED in figure 2.4).



Figure 2.4: DS1 board front plate

- SO / EO - intrusive monitoring of the incoming signal from the network / framer (lower jacks of the GREEN and YELLOW marked areas in figure 2.4). Please note, that this type of setup breaks the connection to the framer / network side.
- SI / EI - allows for injection of the signal towards the network / framer (upper jacks of the YELLOW and GREEN marked areas in figure 2.4).

Be aware, that not connecting the Bantam Connectors properly might result in disruption of service. On the DS1 circuit pack the RECEIVE Bantam Connector should be wired to SM, the TRANSMIT Bantam Connector to EM.

3. Testing under weak signal conditions

In certain test scenarios we encountered synchronisation failures during our test run (they were marked RED in the trace log). In some situations we were able to trace back these failures to low signal levels. The level of the signal was below the level given by specifications and recommendations of the standard bodies (to which the Linkbit Anytest E1 card also complies). We encountered such signals

on tie trunk connections as well as in public network configurations. If you are in the situation to test in an environment with prevailing weak signal conditions, we advice the use of an E1 amplifier. In that case please be aware, that the unit under test might also suffer from weak signal levels. E1 amplification units for E1 and T1 may be purchased through BDD. For more information please visit our website <http://www.telecomm.at>.

4. References

References

- [1] *DEFINITY Communications System Generic 2.2 and Generic 3 V2 DS1/CEPT1/ISDN PRI Reference* - Avaya 1994
- [2] *Linkbit AnyTest User Reference Manual* - Linkbit 2003
- [3] *Integrated Services Digital Networks* - Addison Wesley 1991