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# T3 T1 Physical Layer Analyzer

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# Requirements

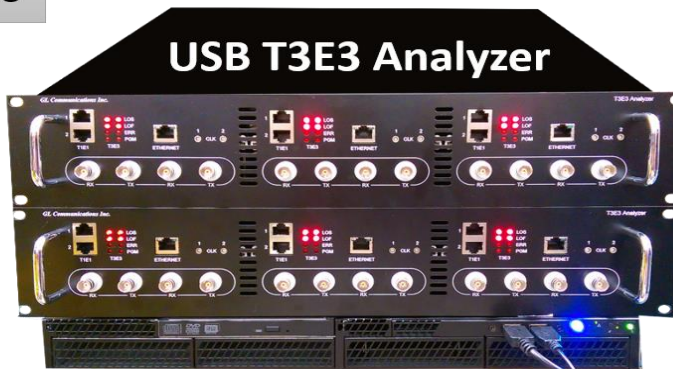
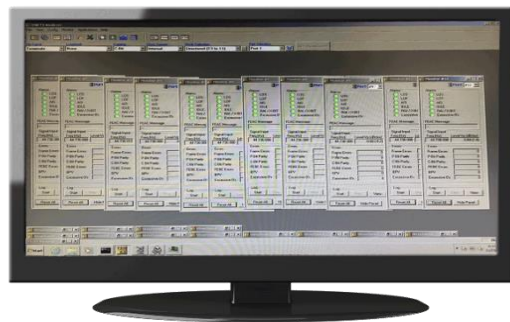
Description	Quantity	ITEM
Custom 19" 2U Rack Enclosure for 3 USB T3 E3 Units + 1 USB T3 E3 unit	1	Other T1 or E1
Dual T3 E3 or T1 E1 Hardware USB Base Unit	3	TE3001
T3 or T1 or E1 Analyzer Basic Software	1	TT3001
Direct T1 Analysis for up to 28 T1s from a T3 – Basic Software	1	TT3200
Physical Layer Analyzer	1	XX100
Record File T1 within T3	1	TTT020
T3 Notification Sender (SNMP)	1	Other T1 or E1
T1 Notification Sender (SNMP)	1	Other T1 or E1

# Introduction

- GL's **USB T3 E3 Analyzer** system, in its 2U Rack design, consists of 6 duplex T3 (DS3), each of 28 T1s, or 672 full duplex voice channels in each DS3. So, six DS3s contain 6 x 672 full duplex DS0s or 4032 full duplex voice channels
- **T3 T1 Physical Layer Analysis** application monitors all physical layer "T3s" and "T1s within the T3s" connected to it via monitor level (non-intrusive - 20 dB attenuated) T3 signals
- Alarms monitored at the DS3 level and at the DS1 level are packetized and sent via SNMP to the TCS's NOC
- Multiple rack units can be stacked together for greater scalability

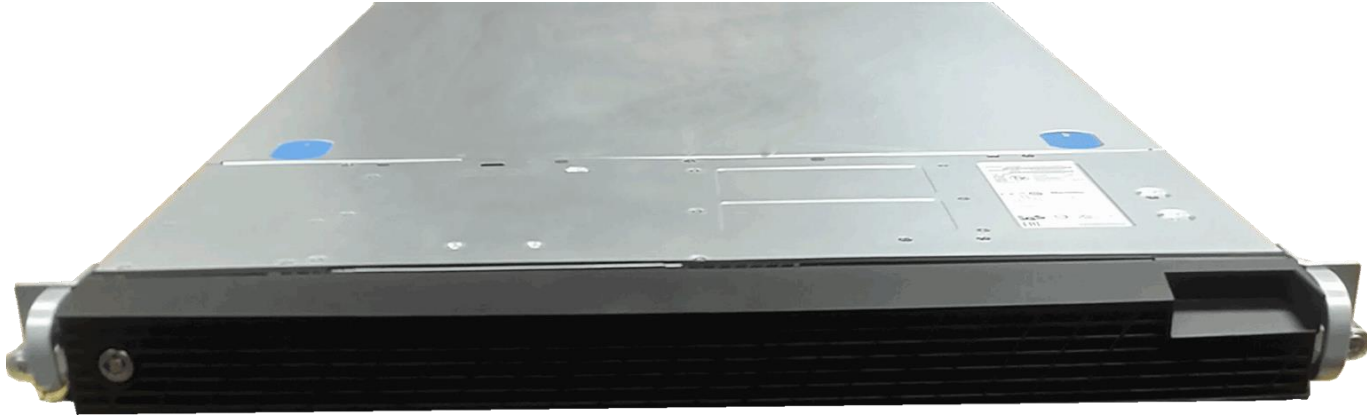
# 2U Rackmount USB T3 E3 Analyzer System for One Site

## T3 T1 Physical Layer Analysis



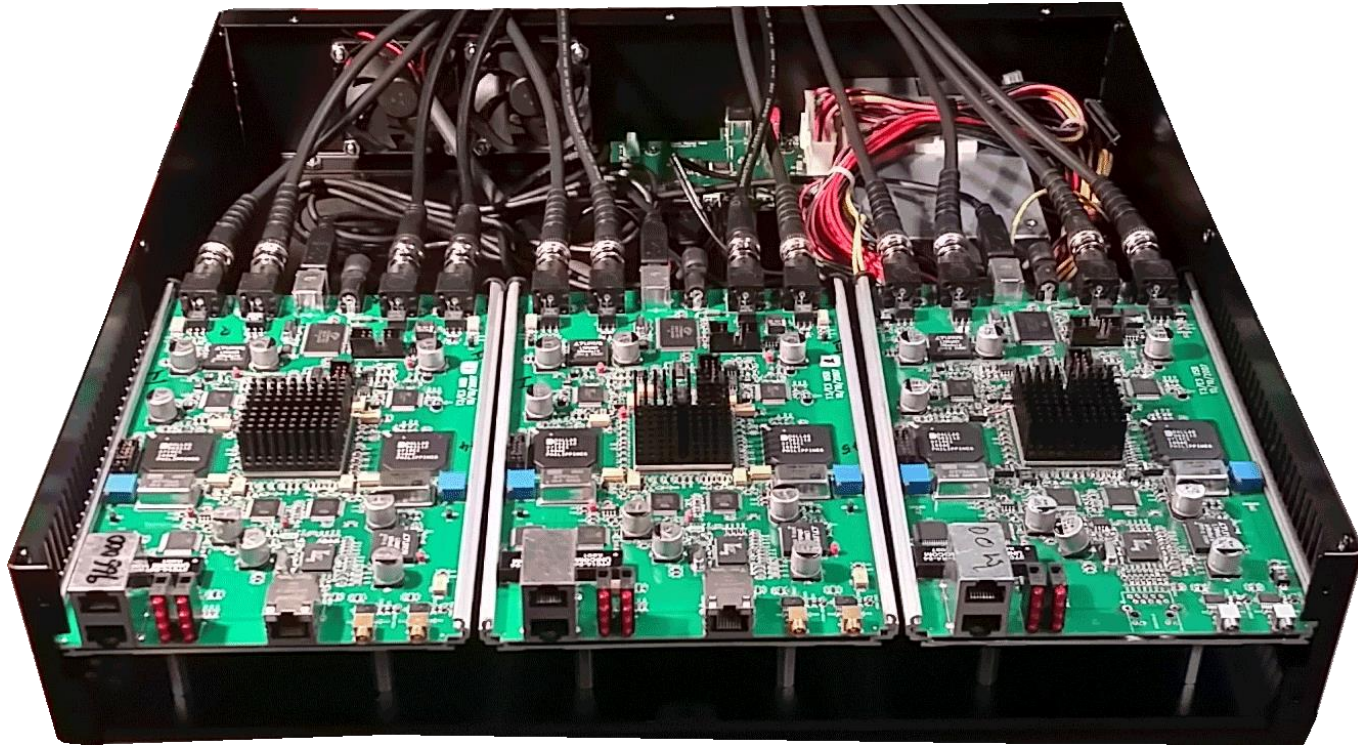
- 5x 19" (2U) Custom Rackmount Enclosures housing USB T3 E3 Units, pre-installed. Four of the Rack enclosures have three USB T3 E3 Analyzers installed in each. One Rack enclosure has just one USB T3 E3 Analyzers installed
  - 2 for Spokane, 2 for Seattle, and One for Lab - All are Labeled

# Server Grade PC for One Site



- 3x 19" (1U) Rack Mount Server Grade PCs w/o Monitor, but with Keyboard, Mouse, Xeon CPU, 8 GB RAM, 500 GB SSD
  - 1 for Spokane, 1 for Seattle, and 1 for Lab - All are Labeled

# Inside View of Rack Enclosure with 3 USB T3 E3 Analyzers

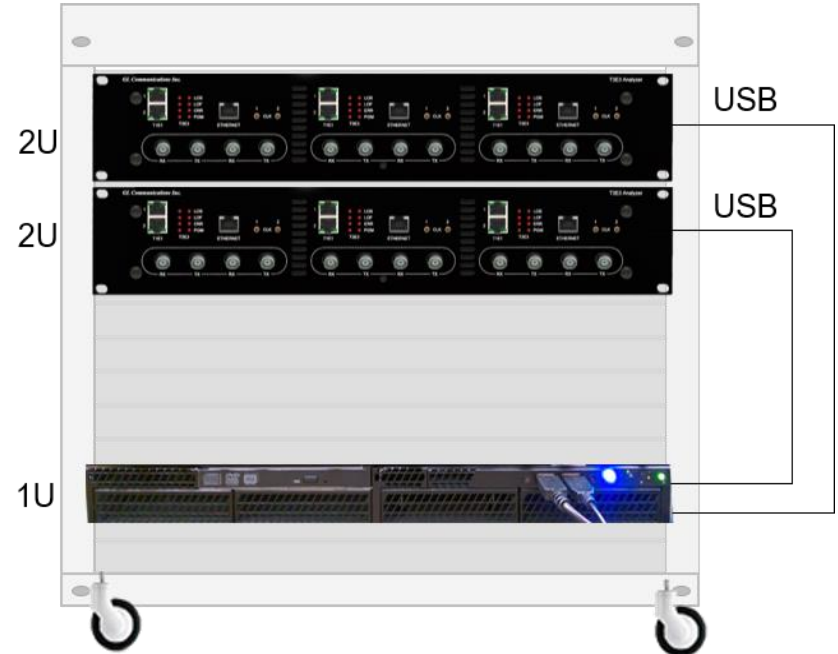


# USB Cables and Accessories Requirement

- 5 USB Cables - Two for Spokane, two for Seattle, one for Lab
  - USB Type B connector cable only for USB 2.0 compliant interface
- External power cables for the Rack Enclosures and Server Grade PCs

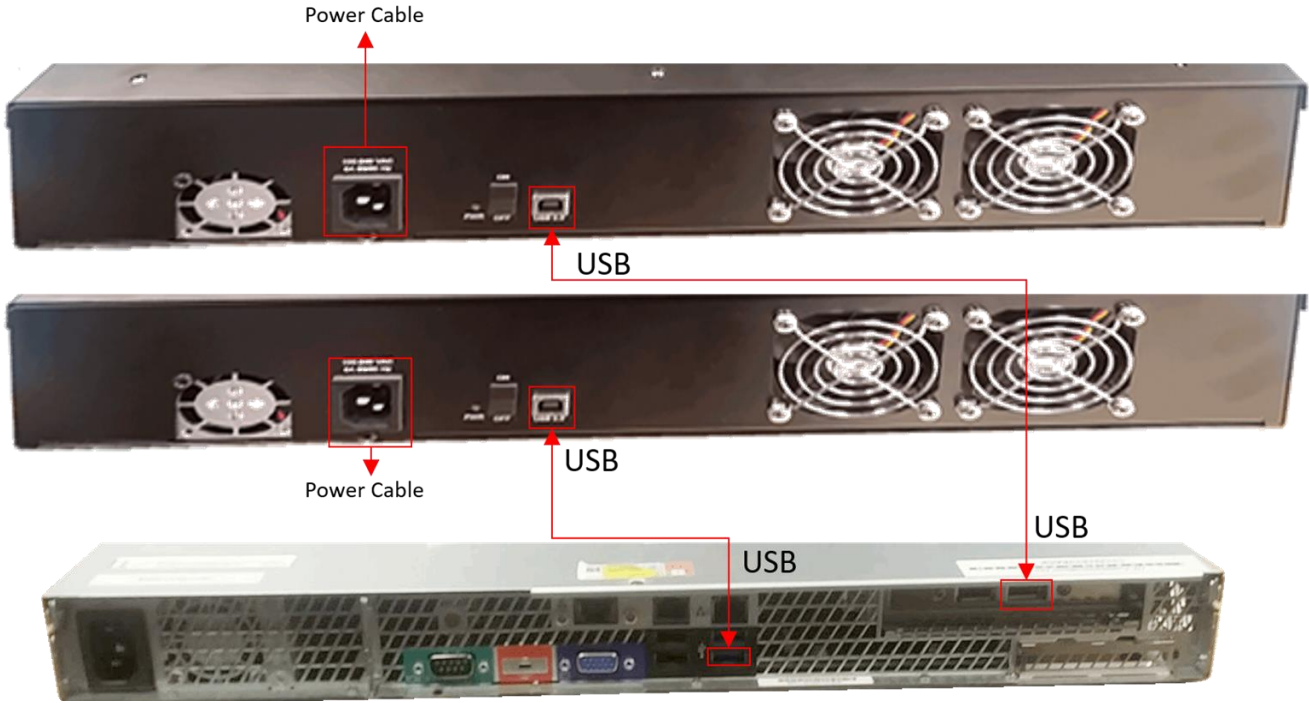
# Install and Power up the Spokane System

- Each T3 Rack Enclosure occupies 2U Rackspace
- Install the 1U Server Grade PC onto the same 19" rack. Connect the external PC accessories such as Keyboard, Mouse, and Monitor as required to the PC
- Connect the USB Cables from the T3 Rack Enclosure to the Server Grade PC exactly as shown below. 1U Rack Mount PC is used to interface and control 2 T3 Rack Enclosure units





# Back Side Connection of USB Cables from T3 Rack Enclosure to the Server Grade PC



# Connecting T3 Monitoring lines to the Rx Ports of T3 Rack Enclosures

- Connect T3 Monitoring lines (up to 12) to each of the Rx Ports of T3 Rack Enclosures using BNC cables
- The T3 ports are numbered sequentially from Port #1 to Port #12, left to right, and bottom to top
- Only the Rx Ports are connected, the Tx Ports are left unconnected
- Ports 1 and 2 are the east and west directions of one full duplex DS3



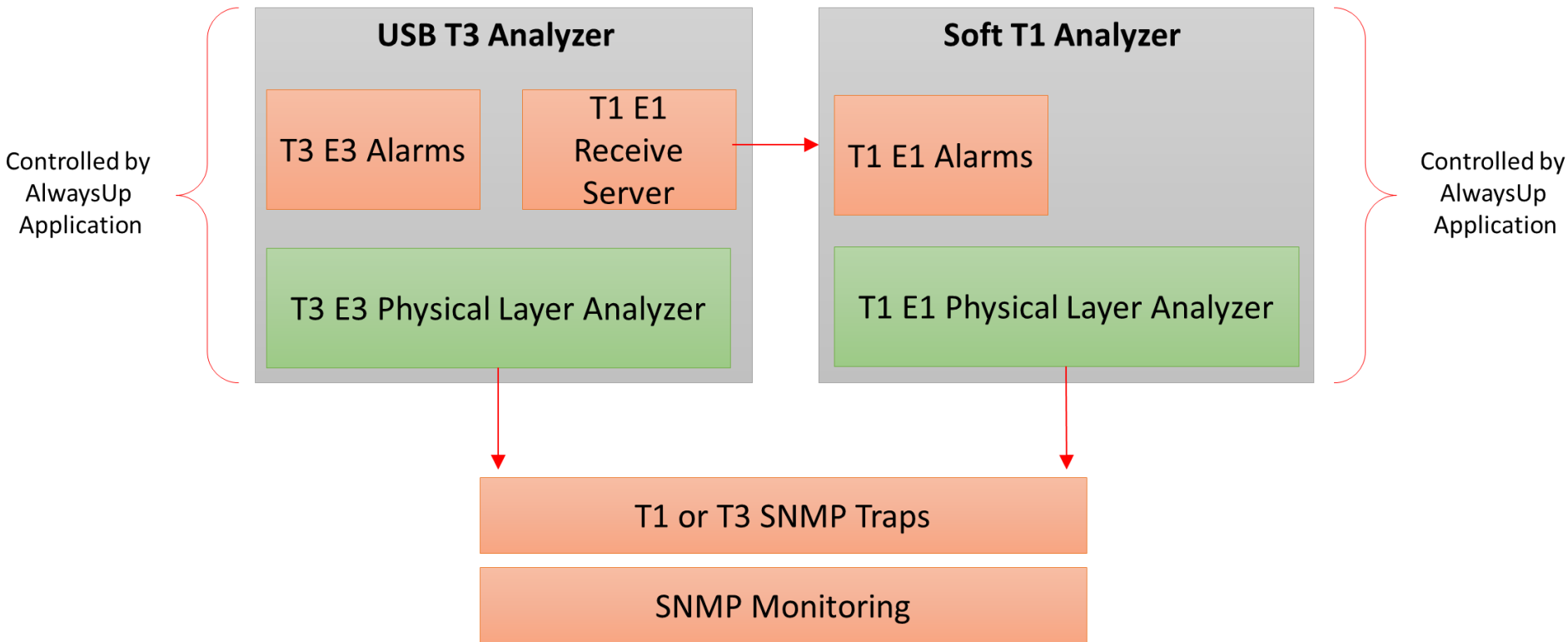
# Verification of Proper Application Running at Spokane

- There should be five to six applications running on the “taskbar”

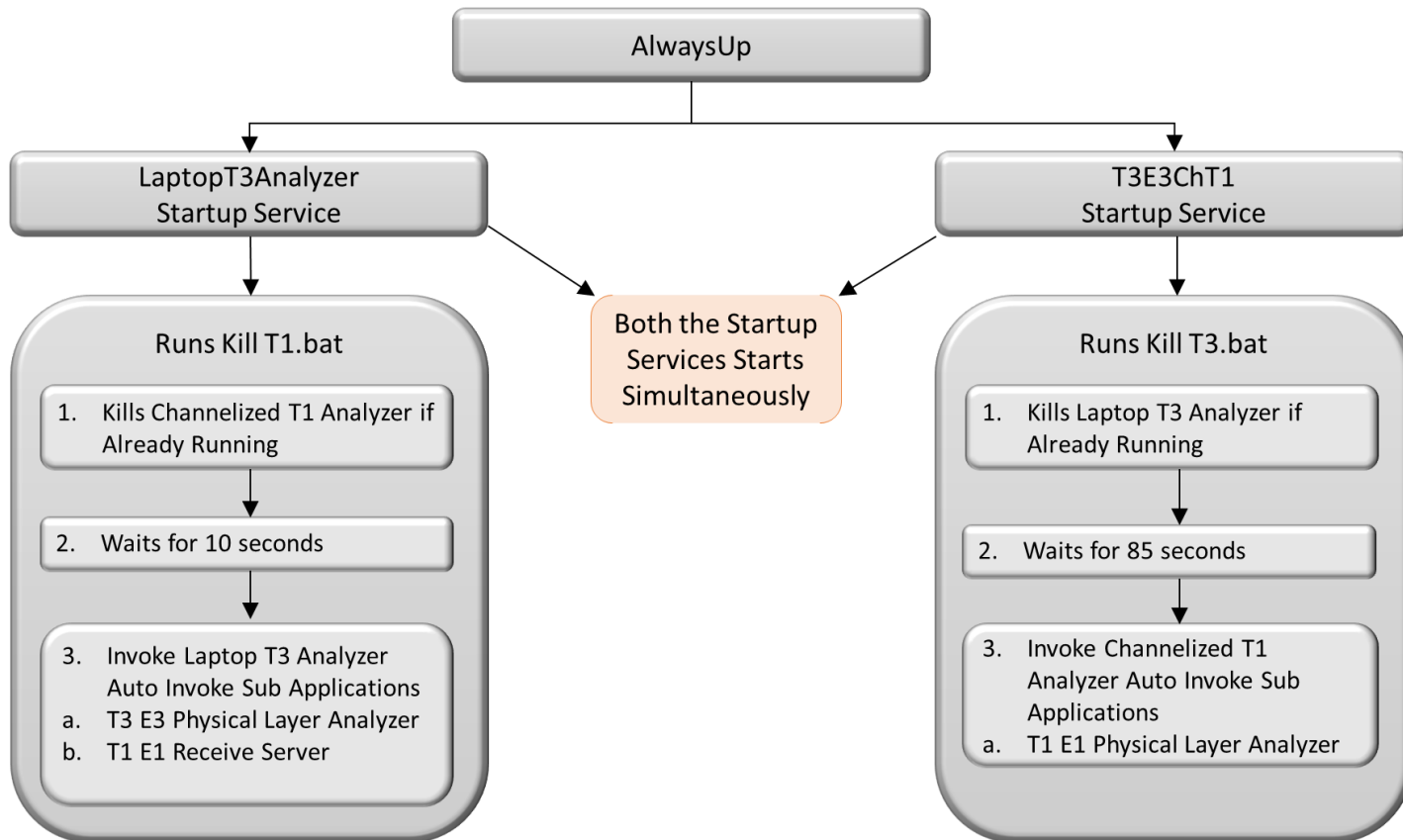
- **TeamViewer App** - is for remote control, may only be there temporarily during initial installation
- **T3 E3 App** - monitors all T3 E3 lines
- **T3 E3 Physical Layer App** - records and sends T3 SNMP messages to NOC
- **Soft T1 E1 App** - monitors all T1 E1 lines within the T3 E3s
- **T1 E1 Physical Layer App** - records and send T1 SNMP messages to NOC
- **AlwaysUp App** - (This icon may be hidden) This ensures that the above four applications are always running. Permits automatic restart on temporary power failure, application failure, temporary PC failure, etc.



# Theory of Operation



# AlwaysUp Theory of Operation



# Kill T1.bat

```
taskkill /f /im "T3E3ChT1.exe"
```

```
TIMEOUT /T 10: wait for 10 seconds.
```

```
/im: will close the T3E3ChT1.exe file.
```

```
/f: will force to close T3E3ChT1.exe  
file.
```

# Kill T3.bat

```
taskkill /f /im "LaptopT3Analyzer.exe"
```

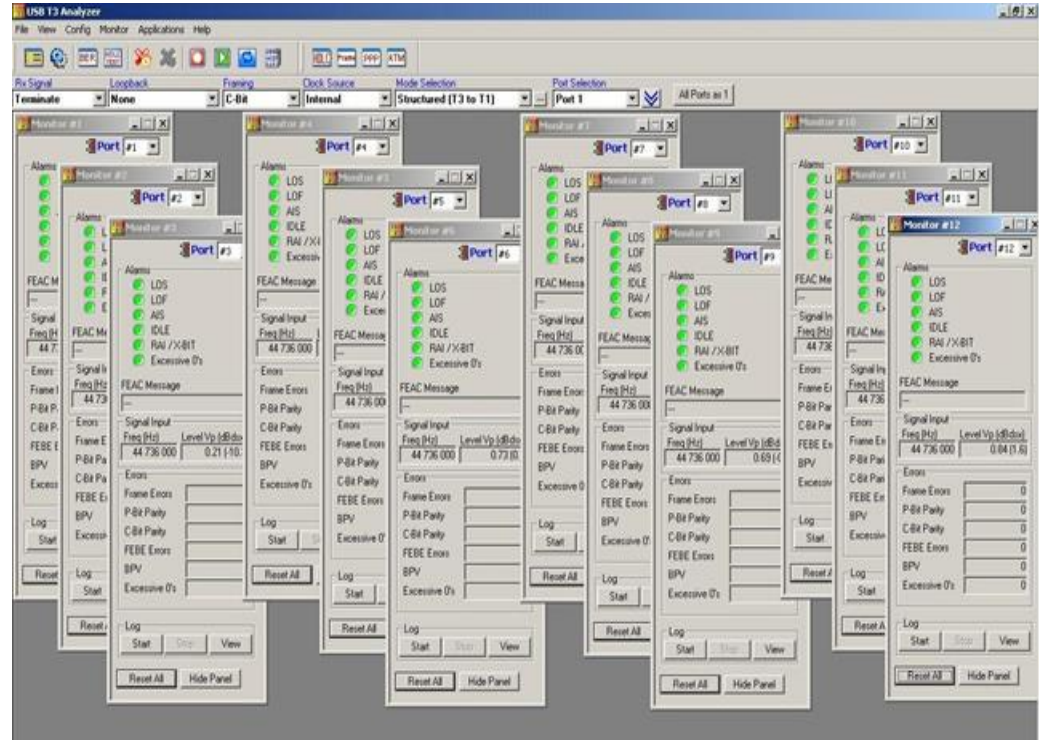
```
TIMEOUT /T 85: wait for 85 seconds.
```

```
/im: will close the LaptopT3Analyzer.exe  
file.
```

```
/f: will force to close  
LaptopT3Analyzer.exe file.
```

# Proper T3 E3 App Operation

- In USB T3 E3 Analyzer application, under monitor alarms, All LEDs appear green - if T3 lines are connected to all of the Rx Ports. There are 12 Rx ports
- Frequency should be approximately 44.736 MHz, and Level may be “Low” or -20 dBsx (minus 20 dBsx)
- No errors or just a few
- If some of the T3s are unconnected, or impaired, then the corresponding monitor boxes will show alarms



# Proper T3 E3 Physical Layer App Operation

- The T3 E3 Physical Layer App monitors the T3 E3 Alarms in real-time, converts them to SNMP messages and sends them to the NOC
- ON/OFF status in the Physical Layer Analyzer depicts the Alarm/No Alarm state respectively

The screenshot displays the 'T3/E3 Physical Layer Protocol Analysis Alarms and Counters' application. The main window contains a table with the following columns: Dev, Frame#, TIME (Date), Error, AIS Alarm Status Physical, Excessive 0's Alarm Status Physical, IDLE Alarm Status Physical, LOF Alarm Status Physical, LOS Alarm Status Physical, and RAI/X-BIT Alarm Status Physical. The table lists 10 frames, all with 'off' status for AIS, Excessive 0's, IDLE, LOF, LOS, and RAI/X-BIT alarms.

Below the table, the 'ATM Frame Data' section shows the following details:

```

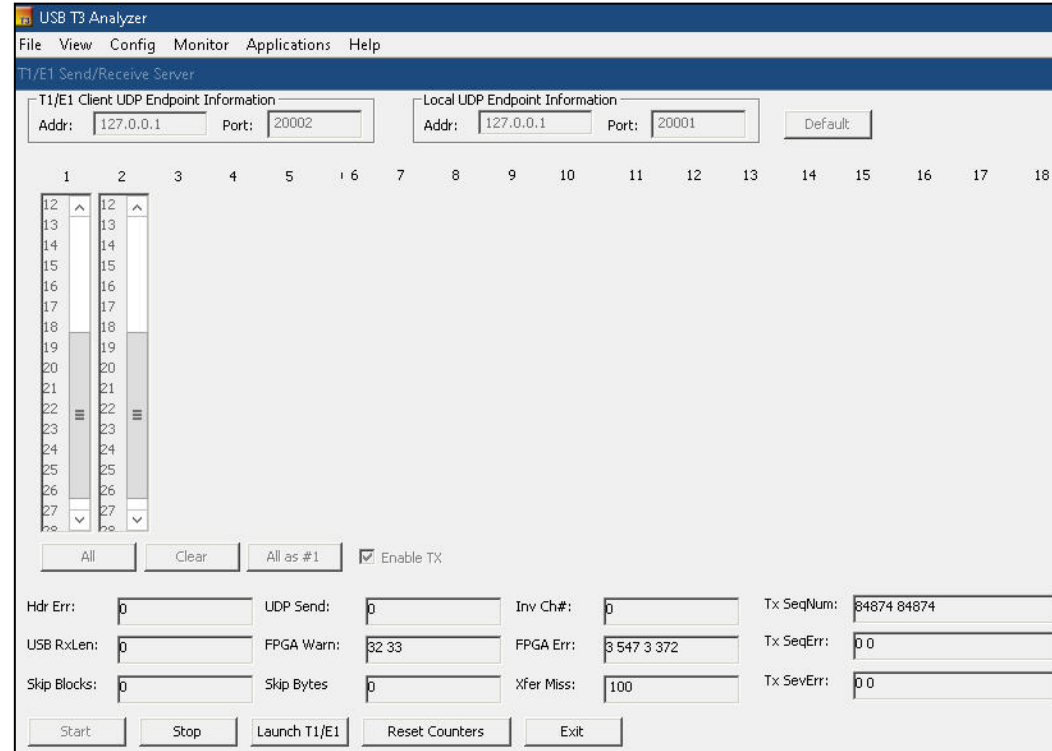
Device: TScout=0 Frame=0 at 2016-12-21 11:54:05.460000 OK Len=14
***** Physical Layer *****
0000 Type = 00000011 T3/E3 Alarms
0001 Counter = 00000110 (6)
    LOS Alarm = 00000000 (0)
    LOS Alarm Status = 00000001 ON
    LOF Alarm = 00000001 (1)
    LOF Alarm Status = 00000001 ON
    AIS Alarm = 00000010 (2)
    AIS Alarm Status = 00000000 off
    IDLE Alarm = 00000011 (3)
    IDLE Alarm Status = 00000000 off
    RAI/X-BIT Alarm = 00000100 (4)
    RAI/X-BIT Alarm Status = 00000000 off
    Excessive 0's Alarm = 00000101 (5)
    Excessive 0's Alarm Status = 00000001 ON
    
```

The status bar at the bottom indicates 'Running. Utilization 0.00%', 'C:\Temp.HDL', and 'Captured 1 394 frames'.



# T1 E1 Send/Receive Server

- The T1/E1 Receive Server application within USB T3 E3 Analyzer acts as software based Demultiplexer application
- Capable of channelization of a T3 signal into 56 independent T1 channels, or 42 independent E1 channels and an E3 signal into 32 E1 channels



# Proper Soft T1 E1 App Operation

The screenshot displays the T1 T3E3 Channelized Analyzer interface. The top section shows a list of ports (328-336) with their respective framing (ESF (193E)). Below this is the T1/E1 Alarms section, which is a grid showing the status of various alarms across different port pairs. The bottom section shows T1/E1 Statistics, which are currently all at zero.

T1/E1 Alarms																		
Reset	All Ports	:320	161:321	161:322	162:323	162:324	163:325	163:326	164:327	164:328	165:329	165:330	166:331	166:332	167:333	167:334	168:335	168:336
Sync Loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Carrier Loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Frame Error	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Blue Alarm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Yellow Alarm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AIS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

T1/E1 Statistics																		
Frequency (Hz)																		
Level (dBdsx)																		
CRC Errors	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frame Errors	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transmit Under Run	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Receive Over Run	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

- The Soft T1 E1 App monitors in real-time all the T1s within the T3s. In the case of 6 full duplex T3s (same as 12 Rx DS3s) one should see a GUI as shown above - for 1:1, 1:2, 2:3, 2:4, ... 168:335, 168:336

# T1 Port Mapping with Reference to T3 Ports

1	2	3	4	5	6	7	8	9	10	11	12
28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s	28 T1s
1:1	1:2	29:57	29:58	57:113	57:114	85:169	85:170	113:225	113:226	141:281	141:282
2:3	2:4	30:59	30:60	58:115	58:116	86:171	86:172	114:227	114:228	142:283	142:284
3:5	3:6	31:61	31:62	59:117	59:118	87:173	87:174	115:229	115:230	143:285	143:286
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
28:55	28:56	56:111	56:112	84:167	84:168	112:223	112:224	140:279	140:280	168:335	168:336

- The first 28 Odd numbered columns (East Ports) are related to the first T3 Port and the first 28 Even numbered columns (Ports) are related to the second T3 Port and so on

# Proper T1 E1 Physical Layer App Operation

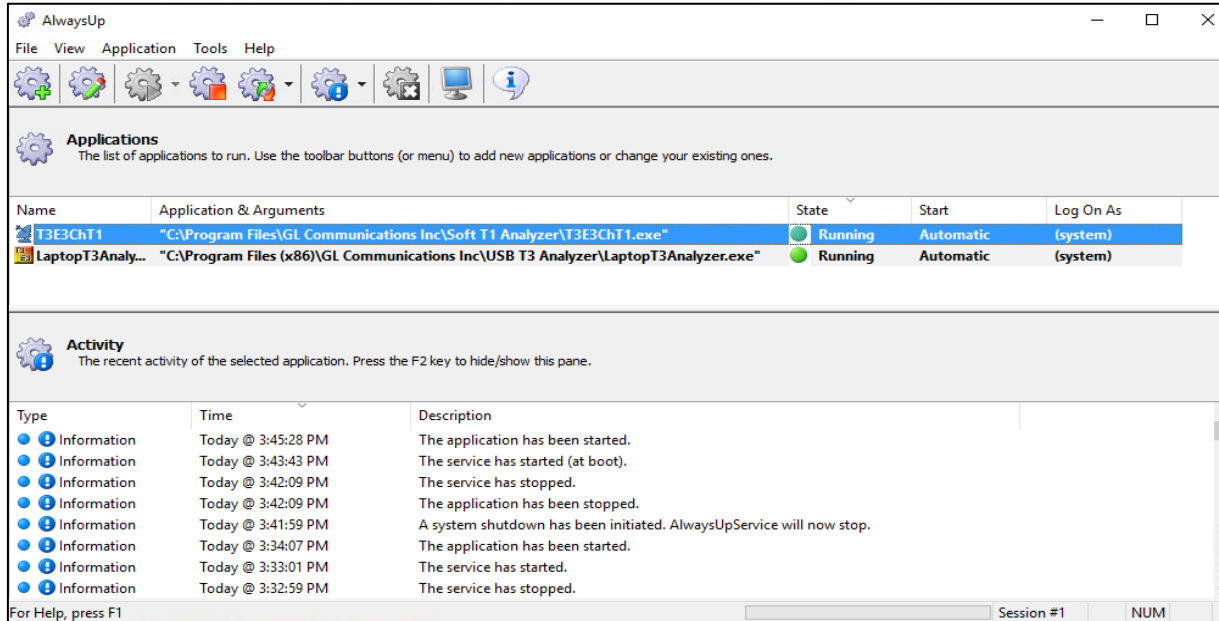
The screenshot displays the 'T1/E1 Physical Layer Protocol Analysis Alarms and Counters' application window. The main window contains a table with the following columns: Dev, Frame#, TIME (Date), Error, AIS Alarm Status T1/E1 Physical, Carrier Loss Alarm Status T1/E1 Physical, Sync Loss Alarm Status T1/E1 Physical, T1 Blue/E1 Remote Alarm Status T1/E1 Physical, and T1 Yellow/E1 Distant Alarm Status T1/E1 Physical. The table lists 11 frames, all with a status of 'ON' for AIS and 'off' for other alarms. Below the table, the 'Device1' section shows 'TScout=0 Frame=0 at 2016-12-21 11:56:57.187000 OK Len=12'. The 'ATM Frame Data' section provides a detailed breakdown of alarm counts and statuses, such as 'Type = 00000001 Alarms' and 'Counter = 00000101 (5)'. The status of various alarms is listed as either 'ON' or 'off'. The bottom status bar indicates 'Running. Utilization 0.00%' and 'C:\Program Files\GL Communications Inc Captured 315 840 frames'.

Dev	Frame#	TIME (Date)	Error	AIS Alarm Status T1/E1 Physical	Carrier Loss Alarm Status T1/E1 Physical	Sync Loss Alarm Status T1/E1 Physical	T1 Blue/E1 Remote Alarm Status T1/E1 Physical	T1 Yellow/E1 Distant Alarm Status T1/E1 Physical
✓ 1	0	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 2	1	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 3	2	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 4	3	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 5	4	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 6	5	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 7	6	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 8	7	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 9	8	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 10	9	2016-12-21 11:56:57.187000		ON	off	ON	ON	off
✓ 11	10	2016-12-21 11:56:57.187000		ON	off	ON	ON	off

```
Device1 TScout=0 Frame=0 at 2016-12-21 11:56:57.187000 OK Len=12 *** Right click to SHOW/HIDE  
ATM Frame Data  
===== T1/E1 Physical Layer =====  
0000 Type = 00000001 Alarms  
0001 Counter = 00000101 (5)  
Sync Loss Alarm = 00000000 (0)  
Sync Loss Alarm Status = 00000001 ON  
Carrier Loss Alarm = 00000001 (1)  
Carrier Loss Alarm Status = 00000000 off  
T1 Blue/E1 Remote Alarm = 00000010 (2)  
T1 Blue/E1 Remote Alarm Status = 00000001 ON  
T1 Yellow/E1 Distant Alarm = 00000011 (3)  
T1 Yellow/E1 Distant Alarm Status = 00000000 off  
AIS Alarm = 00000100 (4)  
AIS Alarm Status = 00000001 ON
```

- The T1 E1 Physical Layer App monitors the T1 E1 Alarms in real-time, converts them to SNMP messages and sends them to the NOC. ON/OFF status in the Physical Layer Analyzer depicts the Alarm/No Alarm state respectively

# Proper AlwaysUp App Operation



- AlwaysUp is configured to run USB T3 Analyzer and Channelized T1 Analyzer for 24\*7, even on automatic restart of PC on temporary power failure, application failure, temporary PC failure, etc.

# T3 SNMP Message Generation

The screenshot displays the configuration and monitoring interface of an SNMP Agent. On the left, a tree view shows the hierarchy of MIBs under the 'SNMP Agent' for the interface '127.0.0.1.161-V2 [Loopback V1]'. The tree includes standard MIBs like 'iso', 'org', 'dod', 'internet', 'directory', 'mgmt', 'mb-2', 'system', 'interfaces', 'at', 'ip', 'icmp', 'tcp', 'udp', 'egp', 'transmission', 'snmp', 'host', 'ianaType', 'mMIB', 'ipv6MIB', 'perfHistTCMIB', 'transportAddressMIB', 'experimental', 'private', 'enterprises', 'lanmanager', 'microsoft', 'wits', 'security', 'snmpV2', and 'snmpDomains'.

On the right, the 'Notifications' pane shows a list of received traps. The 'Port Number' is set to 162. The traps are:

- Trap [V2], 11-30-2016 12:57:02, [::ffff:192.168.12.186], dsx3LineStatusChange  
Community String = TrapComm1  
Request = 1004  
sysUpTime.0 = 0-17:6:50.00  
snmpTrapOID.0 = dsx3LineStatusChange  
dsx3LineStatus.2 = 1  
dsx3LineStatusLastChange.2 = 0-17:6:50.00
- Trap [V2], 11-30-2016 12:57:05, [::ffff:192.168.12.186], dsx3LineStatusChange  
Community String = TrapComm1  
Request = 1005  
sysUpTime.0 = 0-17:6:53.00  
snmpTrapOID.0 = dsx3LineStatusChange  
dsx3LineStatus.2 = 608  
dsx3LineStatusLastChange.2 = 0-17:6:53.00
- Trap [V2], 11-30-2016 12:57:07, [::ffff:192.168.12.186], dsx3LineStatusChange  
Community String = TrapComm1  
Request = 1006  
sysUpTime.0 = 0-17:6:55.00  
snmpTrapOID.0 = dsx3LineStatusChange  
dsx3LineStatus.2 = 512  
dsx3LineStatusLastChange.2 = 0-17:6:55.00
- Trap [V2], 11-30-2016 12:57:08, [::ffff:192.168.12.186], dsx3LineStatusChange  
Community String = TrapComm1  
Request = 1007  
sysUpTime.0 = 0-17:6:56.00  
snmpTrapOID.0 = dsx3LineStatusChange  
dsx3LineStatus.2 = 8  
dsx3LineStatusLastChange.2 = 0-17:6:56.00
- Trap [V2], 11-30-2016 12:57:10, [::ffff:192.168.12.186], dsx3LineStatusChange  
Community String = TrapComm1  
Request = 1008  
sysUpTime.0 = 0-17:6:58.00  
snmpTrapOID.0 = dsx3LineStatusChange

Red annotations highlight specific fields in the traps:

- T3 Alarm Indication:** Points to the 'dsx3LineStatusChange' field in the first trap.
- T3 Port Number:** Points to the 'snmpTrapOID.0' field in the second trap.
- T3 Alarm:** Points to the 'dsx3LineStatus.2' field in the second trap, which has the value 608.

Notification Received on port 162

# SNMP DS3 Configuration

- To configure DS3 SNMP Traps user has to find **SnmDS3.ini** from the “C:\Program Files (x86)\GL Communications Inc\USB T3” Analyzer path and has to provide the IP address and UDP Port IDs of the PC on which the DS3 SNMP Traps needs to be monitored

```
[SNMP_CONFIG]
```

```
SNMP_TRAP_RECV_IP_ADDR_PORT.0=192.168.10.99:162
```

```
SNMP_TRAP_RECV_IP_ADDR_PORT.1=192.168.10.99:1162
```

```
SNMP_TRAP_COMMUNITY_NAME.0=TrapComm1
```

```
SNMP_TRAP_COMMUNITY_NAME.1=TrapComm2
```

```
DSX_MAX_PORT_NUMBER=32
```

```
DSX_PORT_DUPLICATE_VALIDATION=1
```

```
DSX_PORT_NUMBER_RANGE_LIST=1-12
```

# T1 SNMP Message Generation

The screenshot displays the configuration of an SNMP Agent and a list of received traps. The left pane shows the MIB tree for the agent at 127.0.0.1:161-V2 [Loopback V1]. The right pane shows a list of traps received on port 162. Red annotations highlight specific fields in the traps:

- T1 Alarm Indication:** Points to the trap OID `dx1LineStatusChange` in the first trap.
- T1 Port Number:** Points to the `snmpTrapOID.0` field in the first trap, which is `dx1LineStatusChange`.
- T1 Alarm:** Points to the `dx1LineStatus.64` field in the first trap, which is `1`.

The traps listed are:

- Trap [V2], 11-30-2016 15:01:09, [::ffff:192.168.12.186], dx1LineStatusChange  
Community String = TrapComm1  
Request = 1361  
sysUpTime.0 = 0-0:0:8.00  
snmpTrapOID.0 = dx1LineStatusChange  
dx1LineStatus.64 = 1  
dx1LineStatus.LastChange.64 = 0-0:0:8.00
- Trap [V2], 11-30-2016 15:01:09, [::ffff:192.168.12.186], dx1LineStatusChange  
Community String = TrapComm1  
Request = 1360  
sysUpTime.0 = 0-0:0:8.00  
snmpTrapOID.0 = dx1LineStatusChange  
dx1LineStatus.60 = 4096  
dx1LineStatus.LastChange.60 = 0-0:0:8.00
- Trap [V2], 11-30-2016 15:01:09, [::ffff:192.168.12.186], dx1LineStatusChange  
Community String = TrapComm1  
Request = 1359  
sysUpTime.0 = 0-0:0:8.00  
snmpTrapOID.0 = dx1LineStatusChange  
dx1LineStatus.59 = 4096  
dx1LineStatus.LastChange.59 = 0-0:0:8.00
- Trap [V2], 11-30-2016 15:01:10, [::ffff:192.168.12.186], dx1LineStatusChange  
Community String = TrapComm1  
Request = 1363  
sysUpTime.0 = 0-0:0:9.00  
snmpTrapOID.0 = dx1LineStatusChange  
dx1LineStatus.64 = 4096  
dx1LineStatus.LastChange.64 = 0-0:0:9.00
- Trap [V2], 11-30-2016 15:01:10, [::ffff:192.168.12.186], dx1LineStatusChange  
Community String = TrapComm1  
Request = 1362  
sysUpTime.0 = 0-0:0:9.00  
snmpTrapOID.0 = dx1LineStatusChange  
dx1LineStatus.57 = 4096

Notification Received on port 162



# SNMP DS1 Configuration

- To configure DS1 SNMP Traps user has to find **SnmprDS1.ini** from the “C:\Program Files\GL Communications Inc\Soft T1” Analyzer path and must provide the IP address and UDP Port IDs of the PC on which the DS1 SNMP Traps needs to be monitored

```
[SNMP_CONFIG]
```

```
SNMP_TRAP_RECV_IP_ADDR_PORT.0=192.168.10.99:162
```

```
SNMP_TRAP_RECV_IP_ADDR_PORT.1=192.168.10.99:1162
```

```
SNMP_TRAP_COMMUNITY_NAME.0=TrapComm1
```

```
SNMP_TRAP_COMMUNITY_NAME.1=TrapComm2
```

```
DSX_MAX_PORT_NUMBER=336
```

```
DSX_PORT_DUPLICATE_VALIDATION=1
```

```
DSX_PORT_NUMBER_RANGE_LIST=1-3 filter
```

```
DSX_PORT_NUMBER_RANGE_LIST=1-336
```

# Observing Data of T1 timeslots at DSO Level in Channelized T1 Analyzer

- The data and signaling on DS0s of T1s extracted from the de-multiplexed T3 link can be monitored using various applications included under the Monitor menu
- Any one of the channelized T1 ports - from Port #1 to Port #336 can be selected per window. Open multiple instances of these windows to monitor more than one port simultaneously

The screenshot displays four windows from the Channelized T1 Analyzer software, each showing data for a different card. The windows are:

- Display Byte (Card #153):** Shows data for 24 timeslots (TS 0 to TS 23), all displaying the value **7F**.
- Signaling Bits (Card #154):** Shows data for 24 timeslots (TS 0 to TS 23), all displaying the value **1111**.
- Frequency (Hz) (Card #2):** Shows data for 24 timeslots (TS 0 to TS 23). Values range from **1004** to **1005**.
- Power (dBm) (Card #56):** Shows data for 24 timeslots (TS 0 to TS 23). Values range from **-10.0** to **-29.1**, with TS 5 and TS 6 showing **IDLE**.

Card #153		
TS 0	7F	7F
TS 1	7F	7F
TS 2	7F	7F
TS 3	7F	7F
TS 4	7F	7F
TS 5	7F	7F
TS 6	7F	7F
TS 7	7F	7F
TS 8	7F	7F
TS 9	7F	7F
TS 10	7F	7F
TS 11	7F	7F
TS 12	7F	7F
TS 13	7F	7F
TS 14	7F	7F
TS 15	7F	7F
TS 16	7F	7F
TS 17	7F	7F
TS 18	7F	7F
TS 19	7F	7F
TS 20	7F	7F
TS 21	7F	7F
TS 22	7F	7F
TS 23	7F	7F

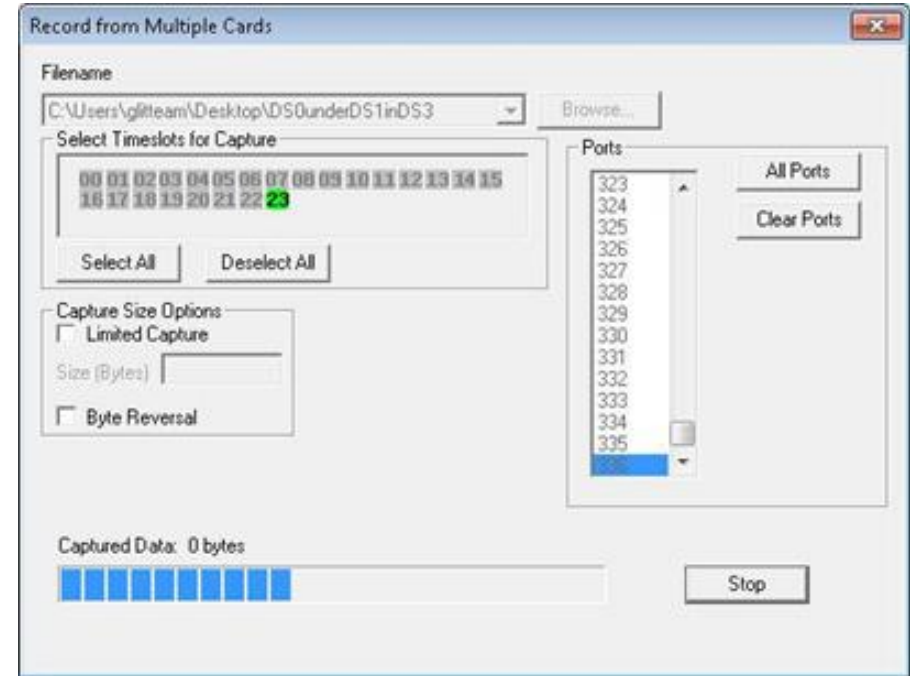
Card #154		
TS 0	1111	1111
TS 1	1111	1111
TS 2	1111	1111
TS 3	1111	1111
TS 4	1111	1111
TS 5	1111	1111
TS 6	1111	1111
TS 7	1111	1111
TS 8	1111	1111
TS 9	1111	1111
TS 10	1111	1111
TS 11	1111	1111
TS 12	1111	1111
TS 13	1111	1111
TS 14	1111	1111
TS 15	1111	1111
TS 16	1111	1111
TS 17	1111	1111
TS 18	1111	1111
TS 19	1111	1111
TS 20	1111	1111
TS 21	1111	1111
TS 22	1111	1111
TS 23	1111	1111

Card #2		
TS 0	1004	1004
TS 1	1004	1004
TS 2	1004	1005
TS 3	1005	1005
TS 4	1005	1005
TS 5	1005	1005
TS 6	1005	1004
TS 7	1004	1004
TS 8	1004	1004
TS 9	1004	1004
TS 10	1005	1005
TS 11	1005	1005
TS 12	1005	1005
TS 13	1005	1005
TS 14	1004	1004
TS 15	1004	1004
TS 16	1004	1004
TS 17	1004	1004
TS 18	1005	1005
TS 19	1005	1005
TS 20	1005	1005
TS 21	1005	1005
TS 22	1004	1004
TS 23	1004	1004

Card #56		
TS 0	-10.0	-26.2
TS 1	-10.0	-24.4
TS 2	-10.0	-23.2
TS 3	-10.0	-23.2
TS 4	-10.0	-23.2
TS 5	IDLE	-23.2
TS 6	IDLE	-23.2
TS 7	-29.1	-23.2
TS 8	-26.2	-23.2
TS 9	-24.4	-23.2
TS 10	-23.2	-23.2
TS 11	-23.2	-23.2
TS 12	-23.2	-23.2
TS 13	-23.2	-23.2
TS 14	-23.2	-23.2
TS 15	-23.2	-23.2
TS 16	-23.2	-23.2
TS 17	-23.2	-23.2
TS 18	-23.2	-23.2
TS 19	-23.2	-23.2
TS 20	-23.2	-23.2
TS 21	-23.2	-23.2
TS 22	-23.2	-23.2
TS 23	-23.2	-23.2

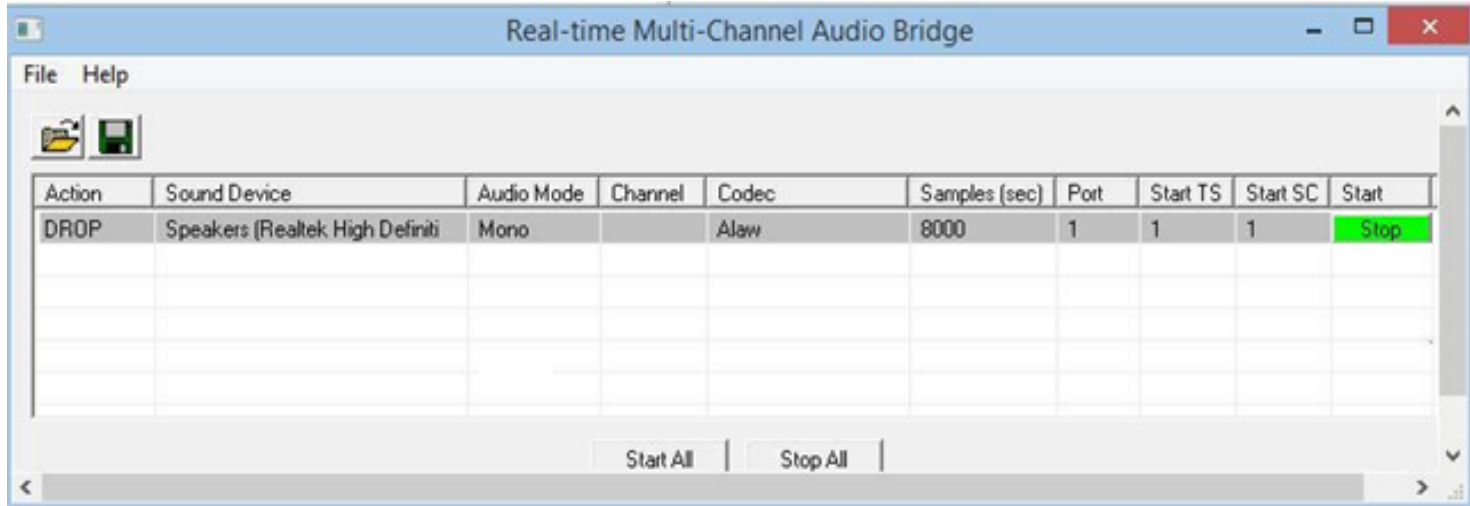
# Record from Multiple Cards in Channelized T1 Analyzer

- This application permits capture of data being transmitted on (any one or all) T1 E1 cards to a file from non-contiguous or contiguous timeslots at DS0 Level
- Capture data from non-contiguous or contiguous timeslots is allowed
- Cards can be selected or deselected by clicking on the listed card number
- Bytes may be captured in reverse order or normal order
- Limited capture (specific number of bytes) to files from all or selected timeslots



# Audio Bridge Monitor in Channelized T1 Analyzer

- The audio signals from selected T1 E1 channels can be dropped on the Left and Right channels of the PC sound card



**Thank you**