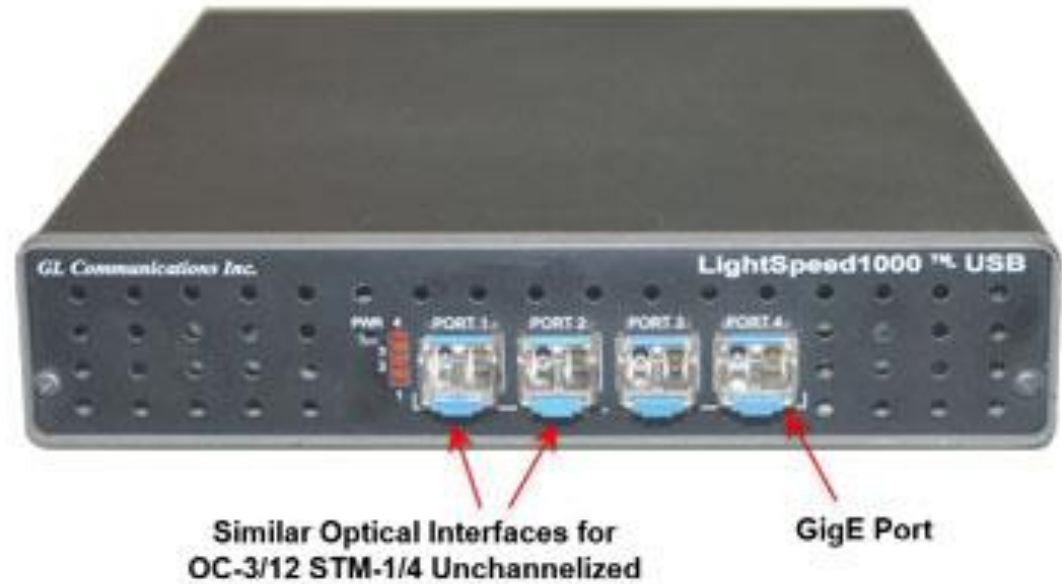
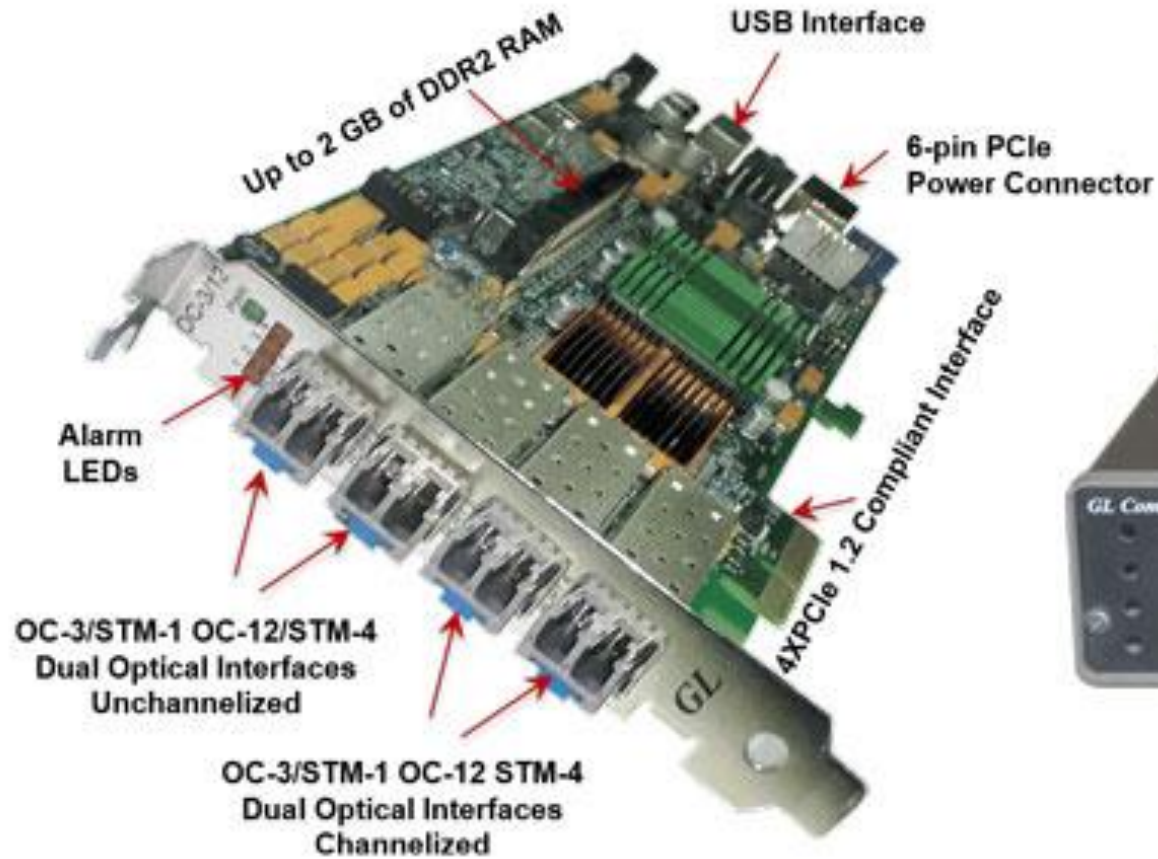

ATM BERT



818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: info@gl.com
Website: <http://www.gl.com>

OC-3 / STM-1 and OC-12 / STM-4 Platforms



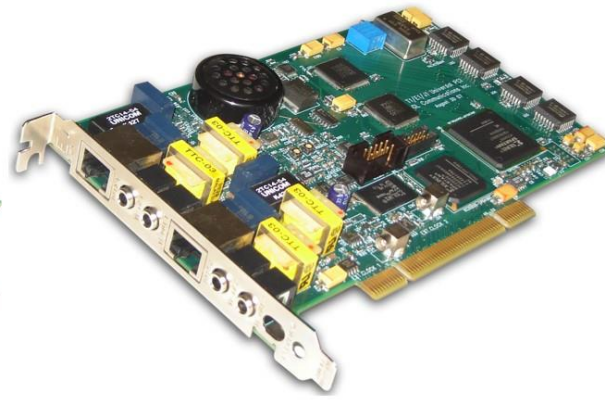
T1/E1 Platforms



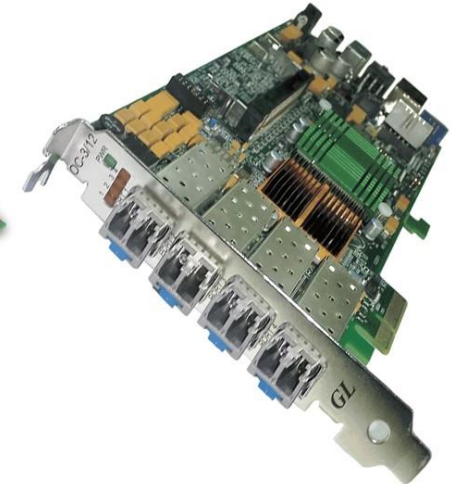
Dual T1 E1 Express (PCIe) T1 E1 Analyzer



Quad / Octal T1 E1 PCIe Card



Dual HD Universal T1 E1 PCI Card



OC3 / OC12 PCIe Card LightSpeed1000™



tScan16™ - T1 E1 Analysis (16 Port Rx Only)



tProbe™ - Portable USB based T1 E1 VF FXO FXS and Serial Data Analyzer

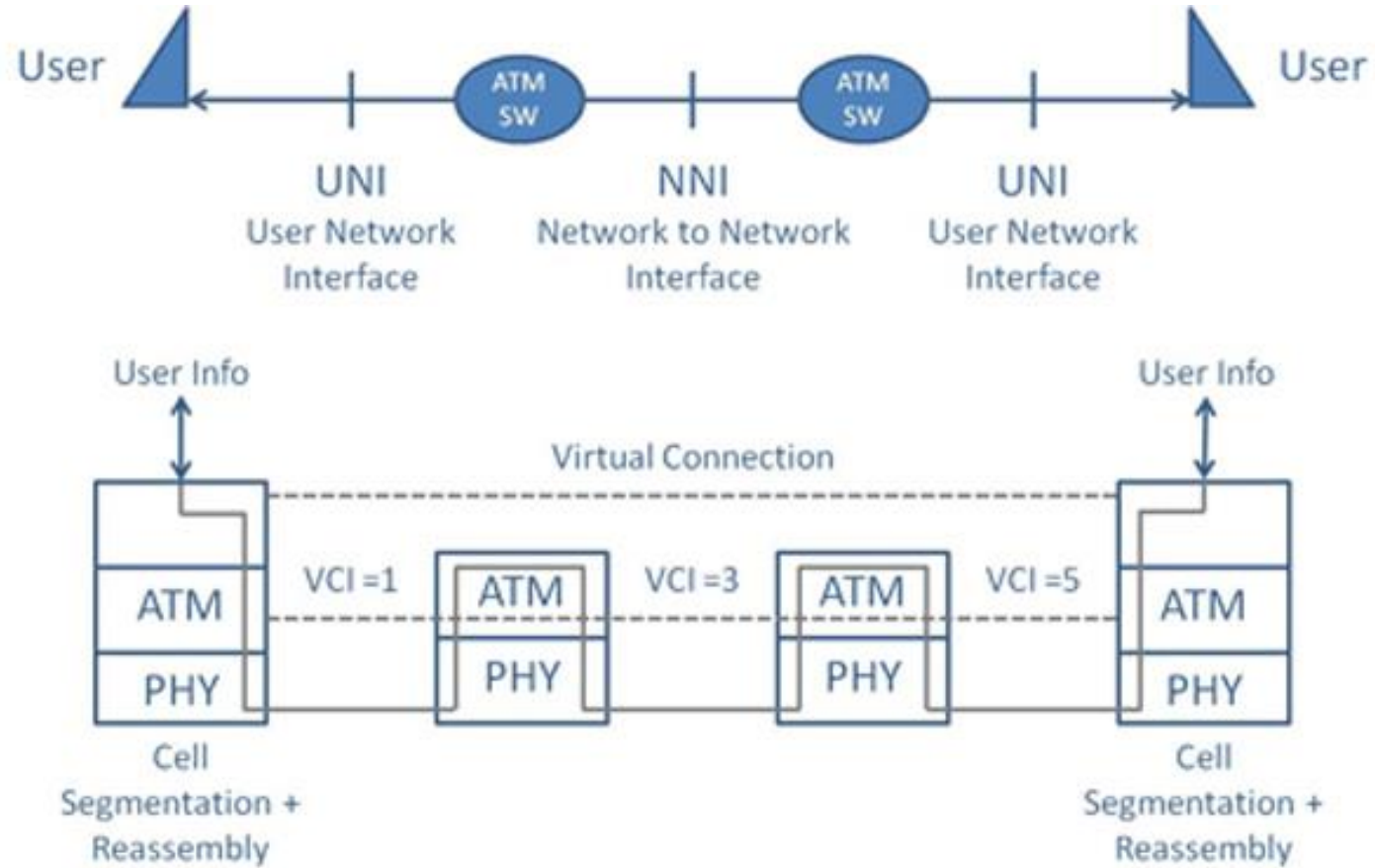


Portable USB based Dual T1 E1 Analyzer Unit



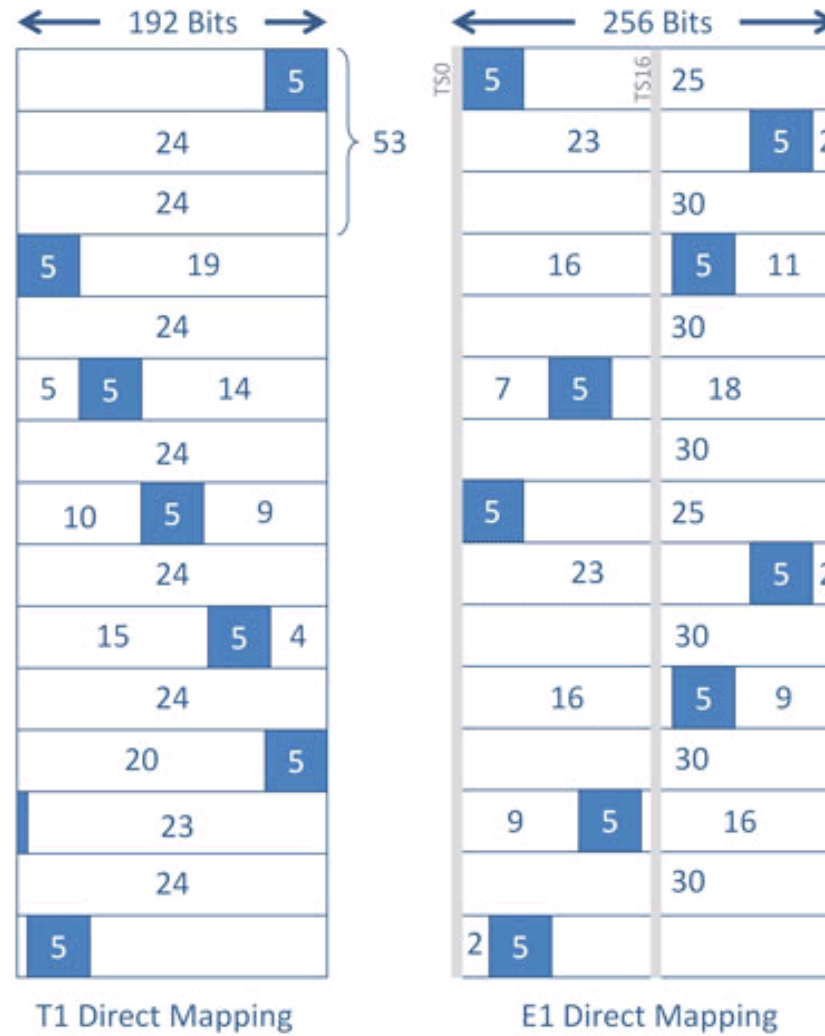
Portable USB based Dual T3 E3 Analyzer Unit

A Typical ATM Circuit

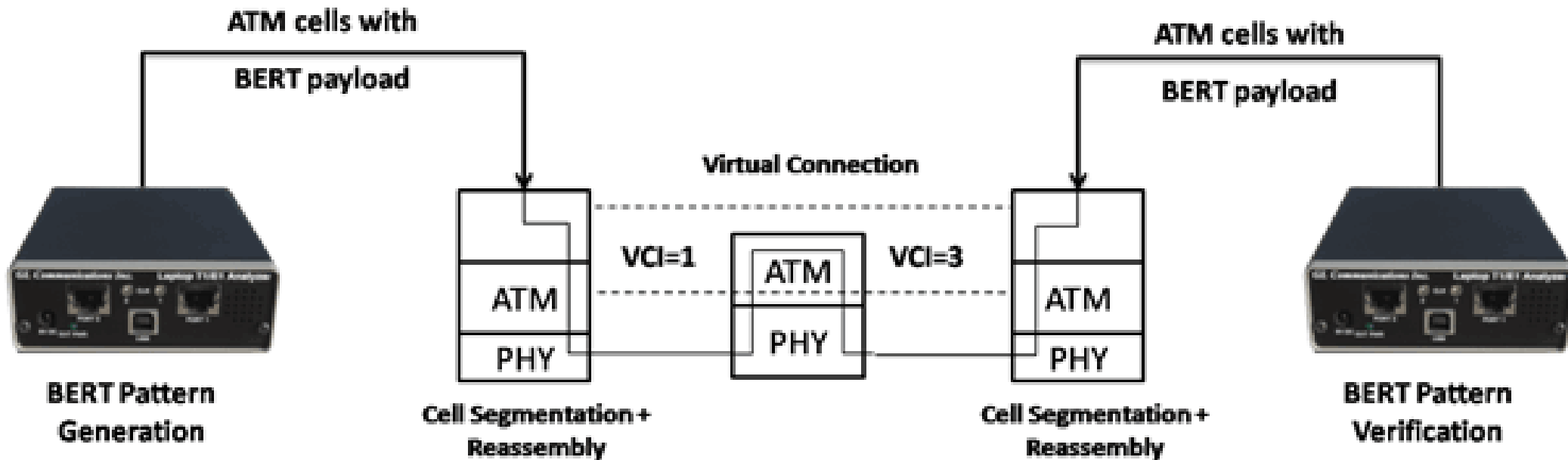


- ATM BERT: A typical ATM BERT application is the verification of end-to-end integrity in an ATM virtual connection

T1 and E1 ATM Direct Mapping



ATM BERT



Features

- Capable of generating /receiving traffic.
- Support user-defined ATM header configuration for GFC, VPI, VCI, PT, CLP
- User-defined traffic rate to the accuracy of 1% of total bandwidth.
- Supports different QRSS, PRBS patterns 2^9-1 , $2^{11}-1$, $2^{15}-1$, $2^{20}-1$, $2^{23}-1$, All one's, All zero's, alternate 1's and 0's, 1:1, 1:7, & User -defined pattern (ranging between 3 to 32 bits).
- Supports inverting, and scrambling payload data. Scrambling is according to ITU-T G.804
- Supports single bit error insertion, and error rate insertion.
- Provides ATM QoS measurement (bit error count/ rate/seconds, sync Loss, no rx data,...)
- Provides ATM Statistics (total cell count, rejected / pass / idle cell counts, cell rate, and HEC error count).
- Provides throughput details, error, and alarm LEDs for easy analysis.
- Supports testing on multiple cards simultaneously with consolidated result view.
- Tx and Rx settings for multiple cards can be independently controlled or coupled.
- Capable to save and load the configuration settings.

ATM Bert - [Untitled]

File View Windows Help

Ports: Port 1

Configurations

- Port 1
 - Bert
 - Tx Config
 - Rx Config
 - Results
 - Statistics
- Port 2
 - Bert
 - Tx Config
 - Rx Config
 - Results
 - Statistics

Start Stop

Tx Config

Port Selection: Port 1 Tx Rx coupled settings

Layer: ATM Header | PayLoad | Traffic Rate | Impairments

ATM Header Fields

User/Network Interface: UNI NNI

GFC: 0 Generic Flow Control (0-15)

VPI: 1 Virtual Path Identifier (0-255)

VCI: 2 Virtual Channel Identifier (0-65535)

PT: 0 Payload Type (0-7)

CLP: 0 Cell Loss Priority (0-1)

Rx Config

Port Selection: Port 1 Tx Rx coupled settings

Layer: Recv Filter | PayLoad

BERT Configuration

BER Pattern: QRSS

31 User Defined Pattern 0 Length

000 3 bits

All Ones All Zeros 0

Invert Pattern Scramble

Timeslot Selection

"Control + click" to select TS

1	5	9	13	17	21	25	29
2	6	10	14	18	22	26	30
3	7	11	15	19	23	27	31
4	8	12	16	20	24	28	

Select All Unselect All

Sub Channel Selection

7							0
1	1	1	1	1	1	1	FF

Results

Port Selection: Port 1 Reset Clear LED History In

Bert Status		
Rx No Traffic	●	Not Active
Sync Loss	●	Not Active
Bit Error	●	Not Active

Bert Statistics	Values
BERT Status	SYNC
Test Time	00:00:06
No Rx Data Count	0
No Rx Data Seconds	0
Bits Received	91145
Bit Error Count	0
Bit Error Rate	0.0000E+000
Bit Error Seconds	0
Sync Loss Count	0
Sync Loss Seconds	0
Error Free Seconds	6

Statistics

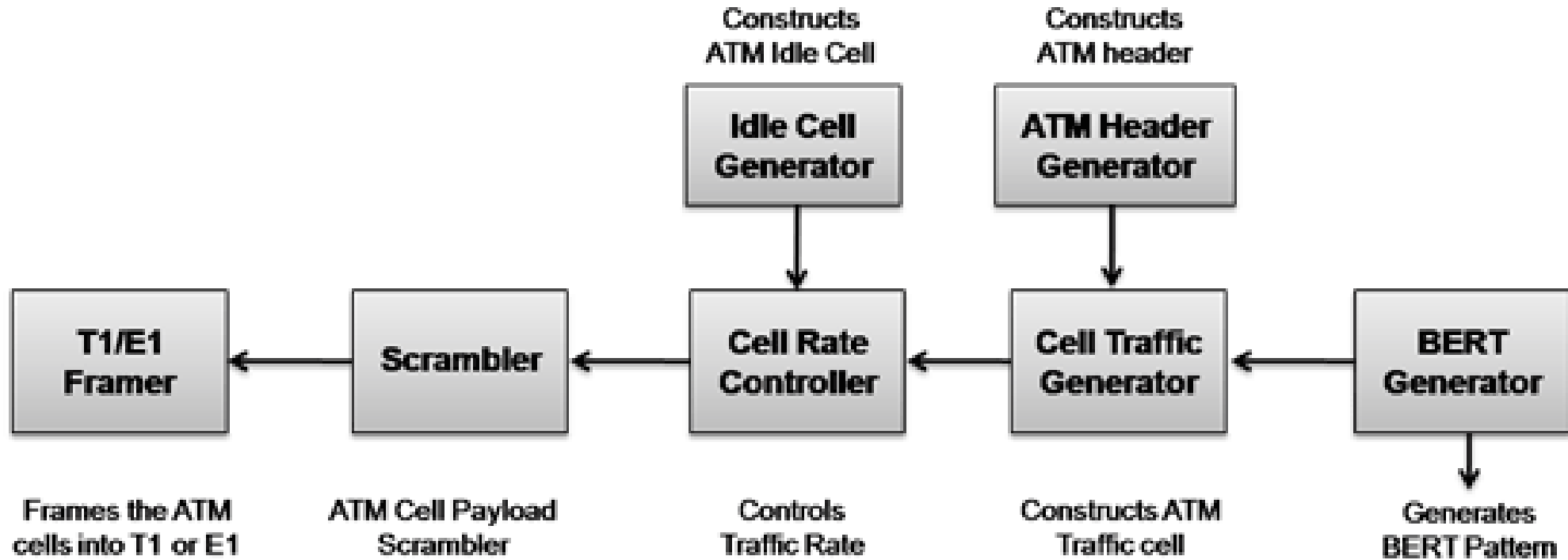
Port Selection: Port 1 Reset Rx

Tx	Values	Rx	Values
Cell count	-	Total cell count	48810
Byte count	-	Cell rate	483
		Idle Cell count	43944
		Rejected cell count	0
		Pass cell count	4885
		HEC error count	0

Tx and Rx Configuration

- **Tx configuring allows to configure the parameters in the Tx direction i.e. outgoing traffic**
Tx Config option allows -
 - Configuring ATM Header fields
 - Configuring various BERT patterns
 - Applying traffic type
 - Invert BER patterns
 - Scrambling
 - Single bit error insertion or error rate insertion
- **Rx configuration allows to configure the parameters for the Rx direction i.e. incoming traffic. Rx parameters are used to compare against incoming traffic and perform BERT measurements**
- **Rx Config option allows configuring –**
 - ATM Header fields
 - BERT Patterns
 - Receive Filters

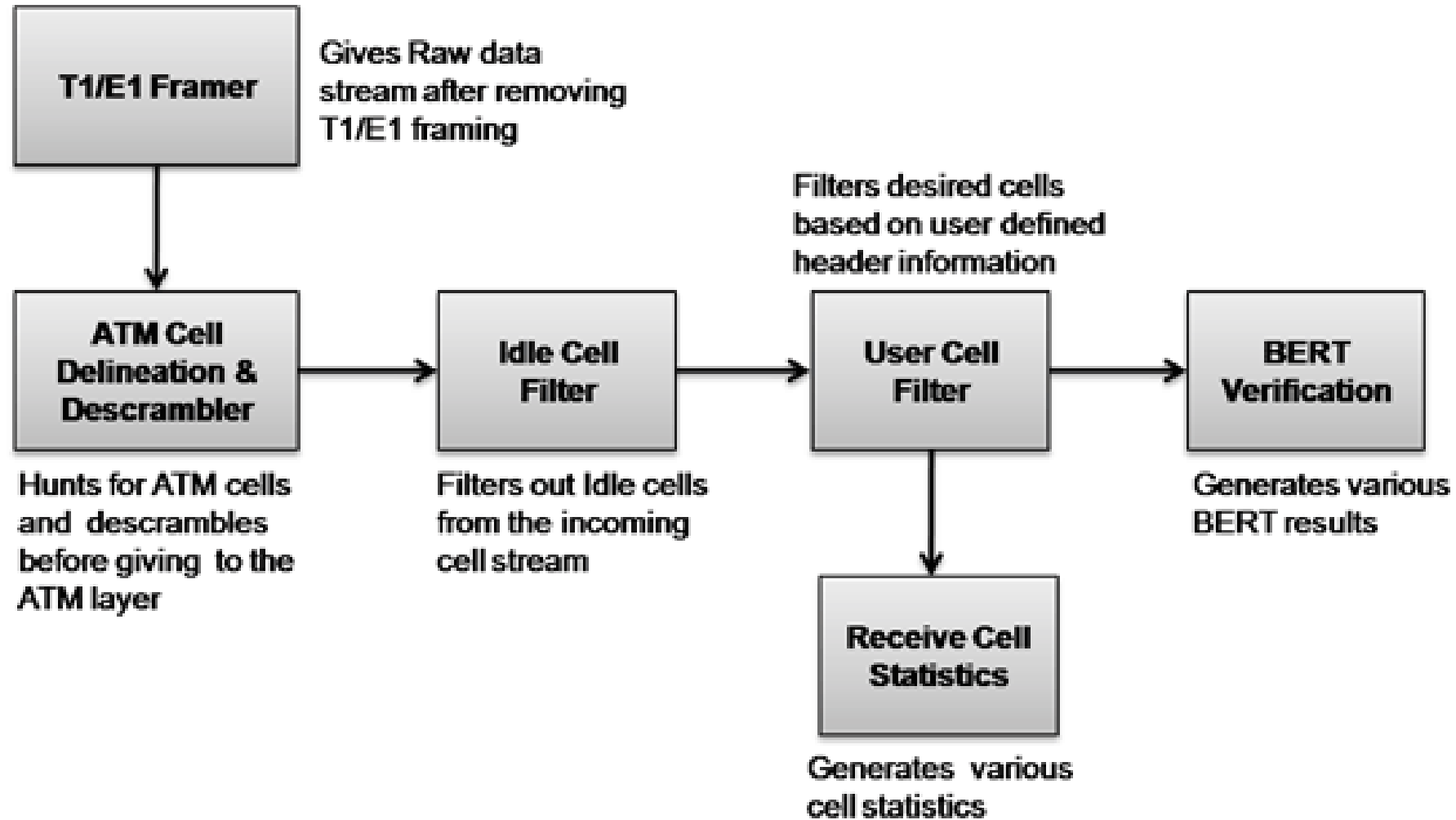
Transmit ATM Block Diagram



Description of Transmit ATM Blocks

- BERT GENERATOR – This logic generates BERT pattern to be transmitted in the payload of the ATM cell. This logic is same as raw BERT logic and provides all functionalities like PRBS, Static and user defined Patterns. Error insertion is also part of this logic.
- ATM Header Generator – This logic constructs traffic cell header using user provided values for VPI, VCI, GFC etc. The transmitter calculates the HEC value across the entire ATM cell header and inserts the result in the appropriate header field.
- Cell Traffic Generator – This logic constructs the 53 byte ATM cell using the ATM header generated by the ATM Header generator block and puts the BERT pattern stream in the 48 byte payload area.
- Idle Cell Generator – This logic provides Idle cells to rate control logic. Idle cells have constant headers and payload.
- Cell Rate Controller – This logic controls rate of total traffic (both traffic cells as well as idle cells). IDLE:TRAFFIC cell ratio is derived from user defined traffic rate.
- Scrambler – The ATM cell payload (48 bytes) can be scrambled before mapping into the T1/E1 Frame. A self-synchronizing scrambler with the generator polynomial $x^{43} + 1$, as described in Recommendation I.432.1.
- T1/E1 Framer – Frames the ATM cells into a T1 or E1 bit stream using direct mapping as defined by ITU specifications. T1 uses timeslots 0-23 and E1 uses timeslots 1-15 and 17-31 to carry

Receive ATM Block Diagram



ATM Receive Description

- **T1/E1 Framer** – Gives raw data stream to the ATM block after removing the T1 or E1 framing information. ATM cells are carried over timeslots 0-23 for T1 and timeslots 1-15 and 17-31 for E1.
- **ATM Cell Delineation and Descrambler** – This logic hunts for ATM cells by performing HEC calculation and keeps retrieving ATM cells while in sync mode. The ATM cell payload will be descrambled before being passed to the ATM layer.
- **Idle Cell filter** – Filters out idle cells from the incoming cell stream.
- **User Cell filter** – This logic filters desired cells based on user defined header information VPI, VCI, GFC etc. It checks the received header information like VPI, VCI, GFC etc against the corresponding values set in the user defined header information. If the filter criteria matches then it extracts the payload and passes to the payload analyzer, otherwise it drops the cells.
- **Receive Cell Statistics** – Determines the Cell statistics to be displayed by the application.
- **BERT Verification** – This takes the payload data from the User Cell filter to determine pattern synchronization. This logic generates various BERT results.

ATM Header Configuration

- Configures the ATM header fields such as VPI, VCI, PT, CLP, and GFC
- ATM header fields for UNI will have GFC (Generic Flow Control) enabled, while for NNI interface GFC field is disabled

The screenshot shows a software window titled "Tx Config" with a close button in the top right corner. Below the title bar, there is a "Port Selection" dropdown menu set to "Port 1" and a checked checkbox for "Tx Rx coupled settings". A tabbed interface below shows four tabs: "Layer", "ATM Header" (highlighted with a red box), "Payload", "Traffic Rate", and "Impairments". The "ATM Header" tab is active and contains a section titled "ATM Header Fields" with a sub-section "User/Network Interface" containing two radio buttons: "UNI" (selected) and "NNI". Below this are five rows of configuration fields, each with a label, a text input box, and a description:

Field	Value	Description
GFC	0	Generic Flow Control (0-15)
VPI	1	Virtual Path Identifier (0-255)
VCI	2	Virtual Channel Identifier (0-65535)
PT	0	Payload Type (0-7)
CLP	0	Cell Loss Priority (0-1)

Traffic Rate

- **The Traffic Rate for ATM BERT can be configured in two ways:**
 - Percent of total bandwidth with range starting from 1% to 100%
 - Cell Ratio, where users can set the ratio of ATM traffic cells to idle cells

The screenshot shows the 'Tx Config' window with the 'Traffic Rate' tab selected. The 'Bandwidth Type' is set to '%', and the 'Bandwidth Rate' is set to 100.00. A dropdown menu is open, showing 'Cell Ratio' as an option. The 'Interleaved Cells' section shows 'Traffic Cells' and 'Idle Cells' both set to 1.

Tx Config

Port Selection: Port 1 Tx Rx coupled settings

Layer: ATM Header | Payload | **Traffic Rate** | Impairments

Bandwidth Type: %

Bandwidth Rate: Rate 100.00

Interleaved Cells: Traffic Cells 1, Idle Cells 1

Cell Ratio

BERT Generation and Detection

Layer | ATM Header | **PayLoad** | Traffic Rate | Impairments

BERT Configuration

BER Pattern **QRSS**

31 User Defined Pattern 0 Length

000 3 bits

All Ones All Zeros 0

Invert Pattern Scramble

Timeslot Selection

"Control + click" to select TS

1	5	9	13	17	21	25	29
2	6	10	14	18	22	26	30
3	7	11	15	19	23	27	31
4	8	12	16	20	24	28	

Select All Unselect All

Sub Channel Selection

7 0

1	1	1	1	1	1	1	1	FF
---	---	---	---	---	---	---	---	----

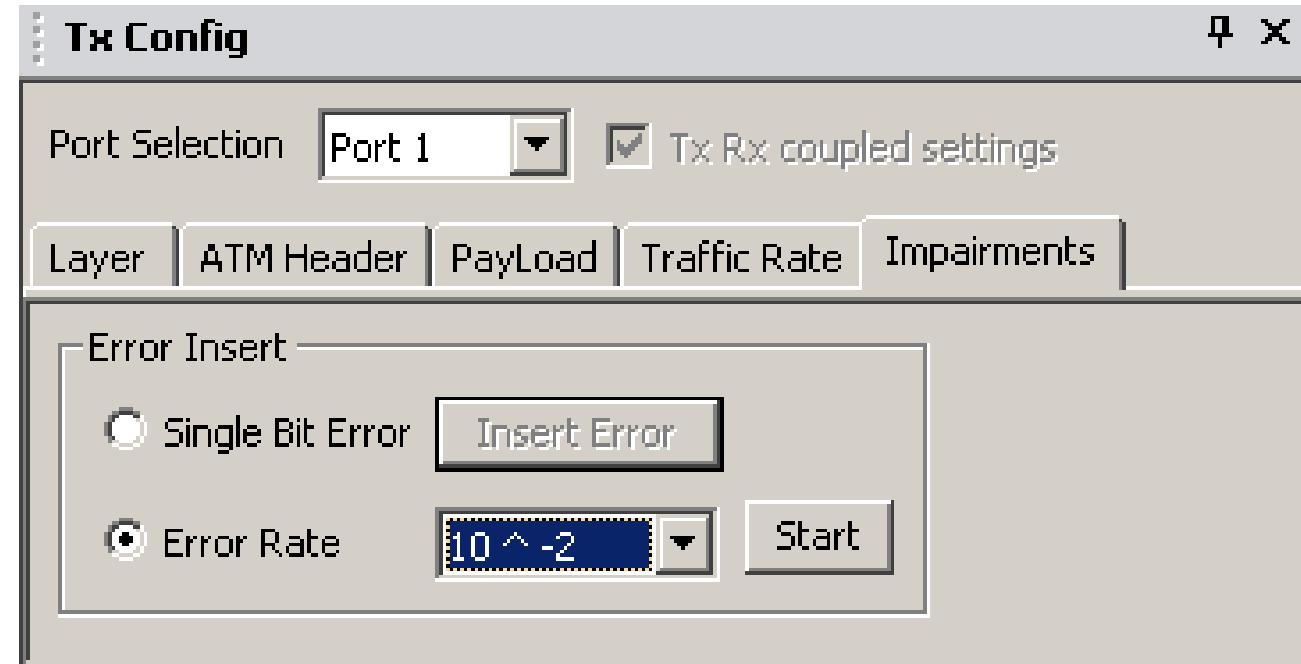
QRSS
2^9-1
2^11-1
2^15-1
2^20-1
2^23-1
ALL ONES
ALL ZEROES
1:1
1:7
Alt. ONES and ZEROES
User Defined

BERT Generation and Detection...

- Payload at the Tx configuration allows user to select specific Bit Error Rate test pattern for transmission.
- Supports various BERT patterns; QRSS, PRBS (29-1, 211-1, 215-1, 220-1, 223-1), fixed patterns like all ones, all zeros, alternate 1s and 0s, 1:1, 1:7, and user-defined patterns.
- Rx configuration pattern is used to verify the incoming BERT pattern
- Other options such as invert and scrambling options (according to ITU-T G.804) are provided.

Error Insertion

- Allows single bit error insertion.
- Also, supports Insertion of Error rate from 10^{-2} to 10^{-9} into the outgoing (TX) stream.



Results

- Displays both BERT Status with LEDs and BERT Statistics
- BERT statistics includes BERT status, Test Time, no rx data, no rx data seconds, bits received, bit errors, bit error rate, bit error count/seconds, sync loss count/seconds, and error free seconds
- BERT Status provides a quick view of the test status in the form of Alarm LEDs

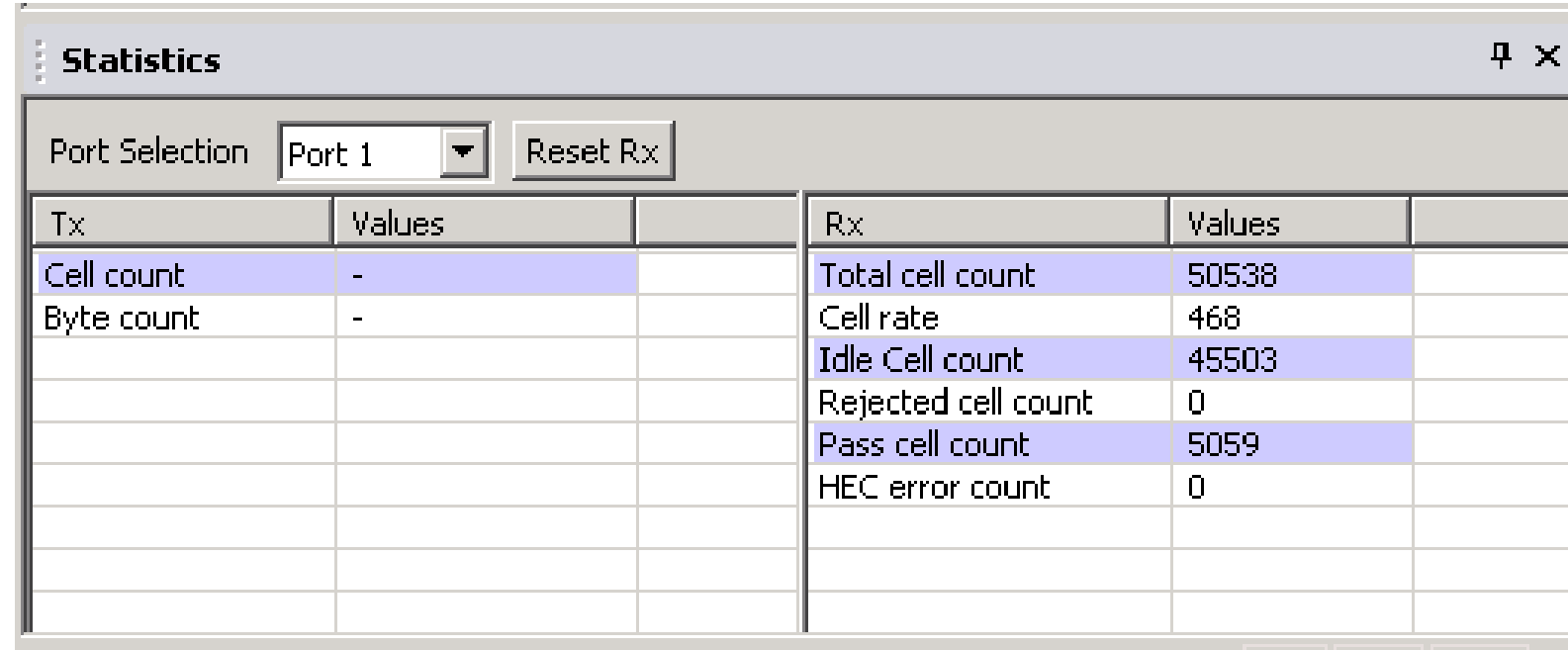
The screenshot shows a software window titled "Results" with a port selection dropdown set to "Port 1" and buttons for "Reset", "Clear LED History", and "Insert Error". Below this are two tables. The first table, "Bert Status", shows three green LEDs for "Rx No Traffic", "Sync Loss", and "Bit Error", all with a "Not Active" status. The second table, "Bert Statistics", lists various metrics and their values.

Bert Status	LED	Status
Rx No Traffic	●	Not Active
Sync Loss	●	Not Active
Bit Error	●	Not Active

Bert Statistics	Values
BERT Status	SYNC
Test Time	00:00:19
No Rx Data Count	0
No Rx Data Seconds	0
Bits Received	1007989080
Bit Error Count	0
Bit Error Rate	0.0000E+000
Bit Error Seconds	0
Sync Loss Count	0
Sync Loss Seconds	0
Error Free Seconds	20

Statistics

- Displays Tx and Rx statistics of the ATM BER test
- Rx statistics includes total cell count, cell rate, idle cell count, rejected cell count, pass cell count, and HEC error count



The screenshot shows a window titled "Statistics" with a "Port Selection" dropdown set to "Port 1" and a "Reset Rx" button. The window contains two tables: one for Tx statistics and one for Rx statistics.

Tx	Values		Rx	Values	
Cell count	-		Total cell count	50538	
Byte count	-		Cell rate	468	
			Idle Cell count	45503	
			Rejected cell count	0	
			Pass cell count	5059	
			HEC error count	0	

THANK YOU