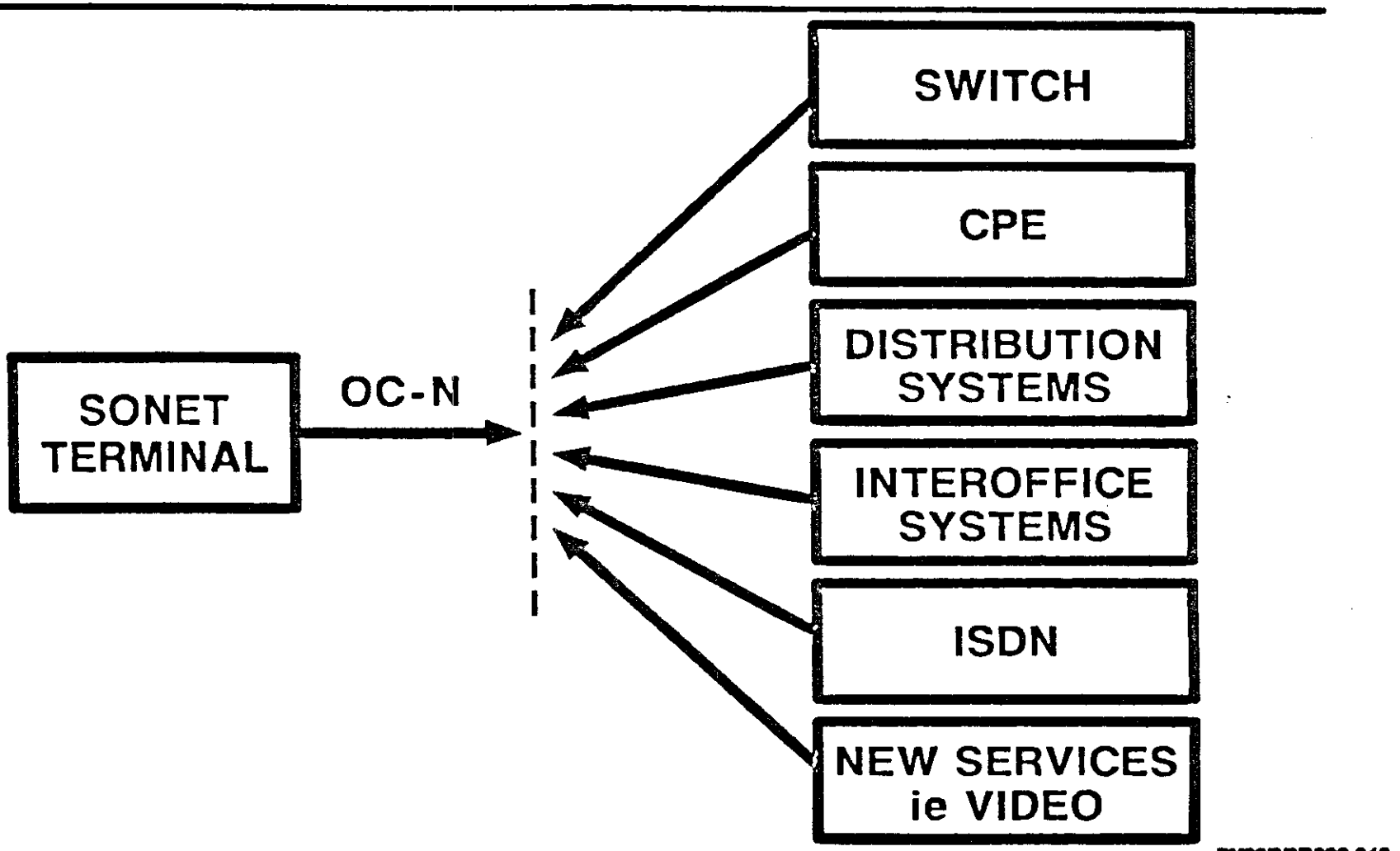
Future Network

- Fiber is the transmission medium of choice
- Customers will require large bandwidth services
- Digital terminals will have direct optical interfaces
- Interoffice and distribution network will merge
- The network will become increasingly synchronous
- Facility maintenance will become an integral part of the network

Synchronous Optical Network (SONET) Project

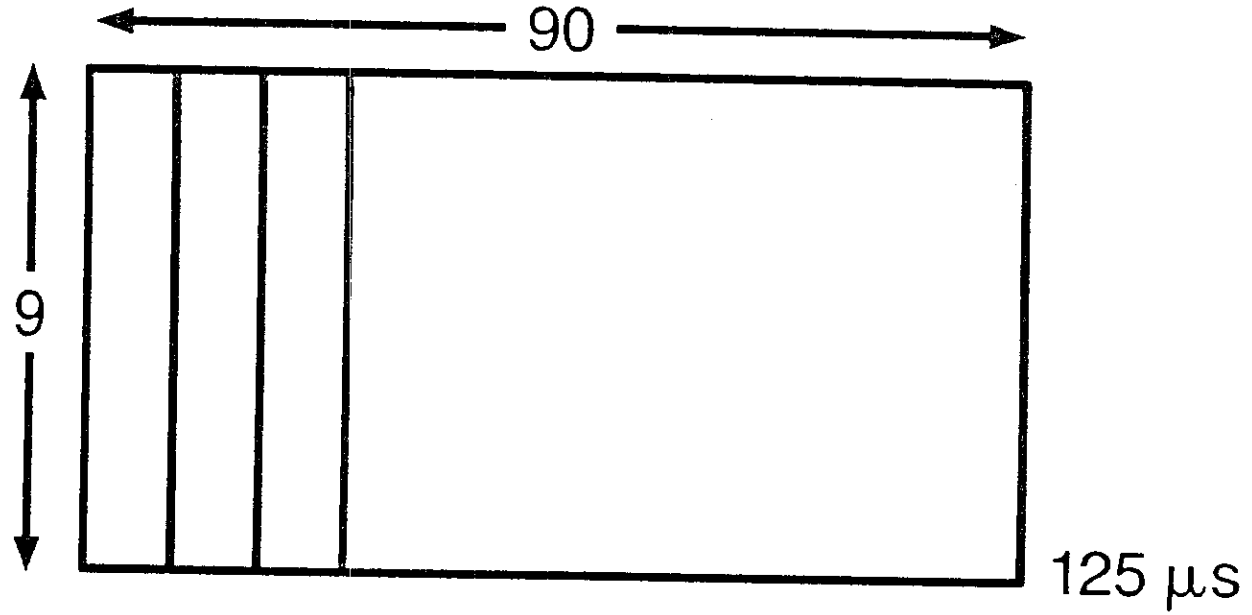
- Basic building block signal of 51.84 Mb/s
  - Standard fixed overhead
    Improved functionality
    Future enhancements
  - Flexible payload
    Synchronous one-step mux
    Transparent transport of synchronous and asynchronous signals
    Accommodation of new services
- Interleave to obtain a family of signals at N X 51.84 Mb/s
- Optical parameters for various interfaces

UNIVERSAL FIBER OPTIC INTERFACE



PY96BRB232.016

An STS-1 Frame



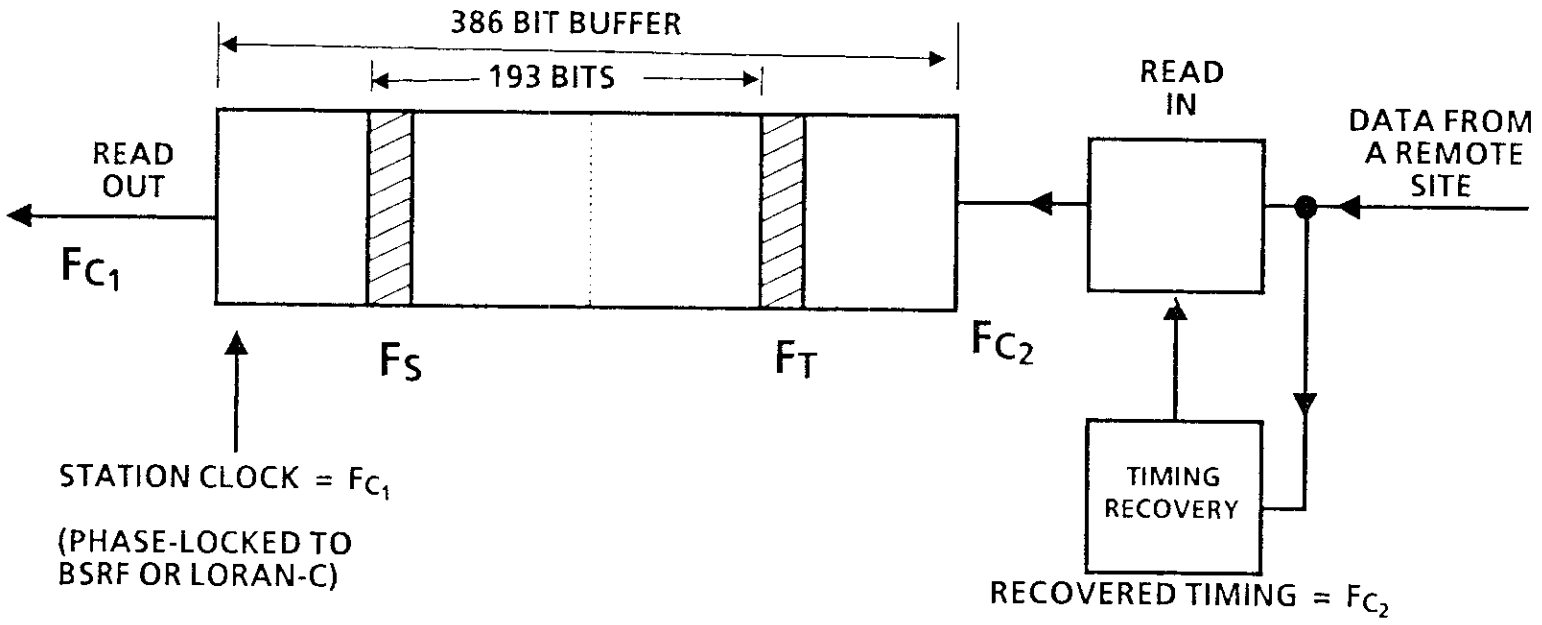
Rate: 51.840 Mb/s

Capacity: 9 x 90 bytes in 125 μs frame
: 27 bytes for overhead
9 x 87 = 783 bytes for payload

- 125 μs frame period to facilitate 64kb/s channels

CONTEL ASC

T1 ELASTIC BUFFER

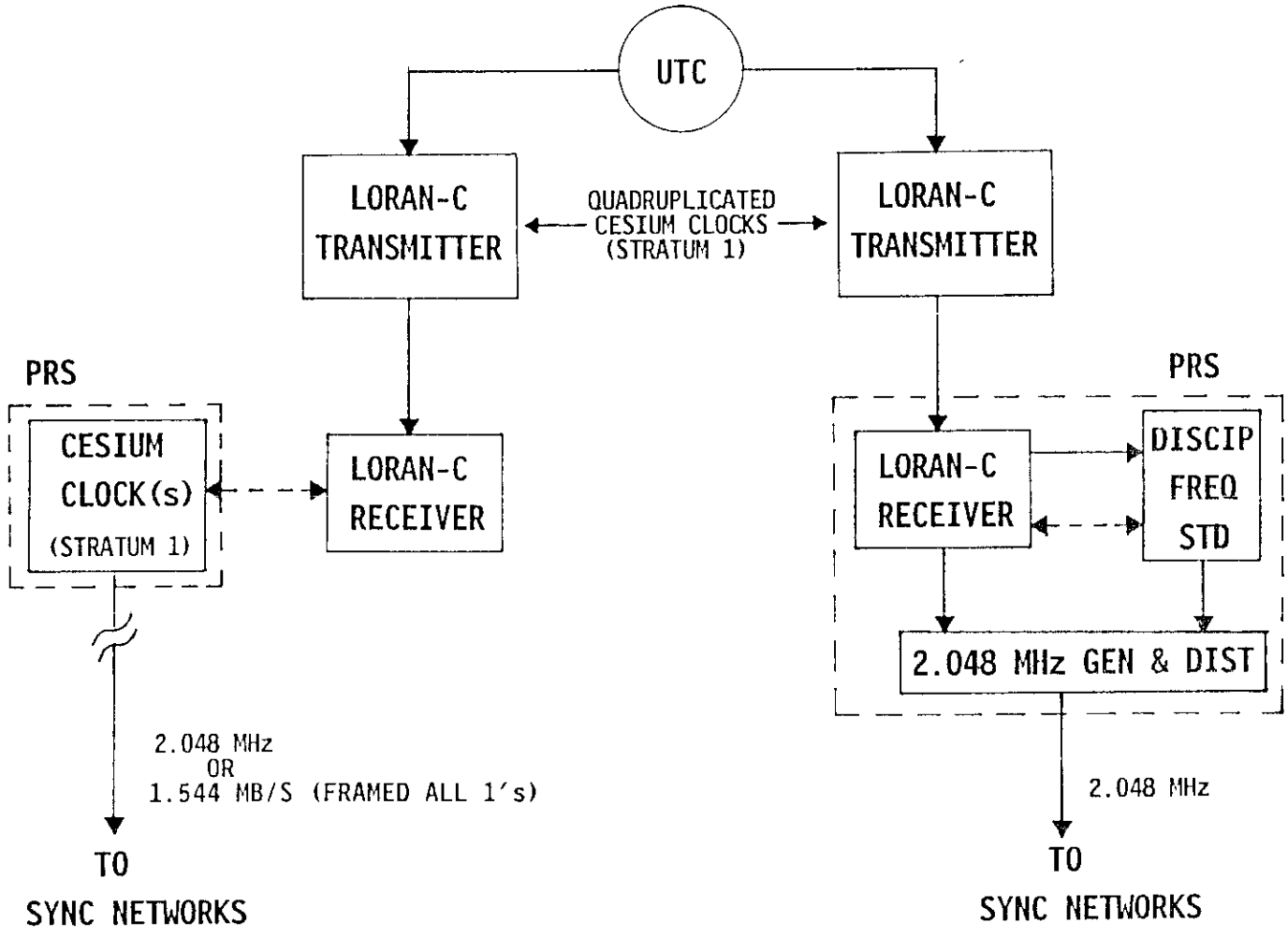


WHEN $F_{C_1} > F_{C_2}$ BUFFER DEPLETES, INSERT THE PREVIOUS FRAME

$F_{C_1} < F_{C_2}$ BUFFER OVERFLOWS, DELETE THE FRAME FROM THE BUFFER

F_T = TERMINAL FRAMING BIT
F_S = SIGNAL FRAMING BIT

PRIMARY REFERENCE SOURCES (PRS)



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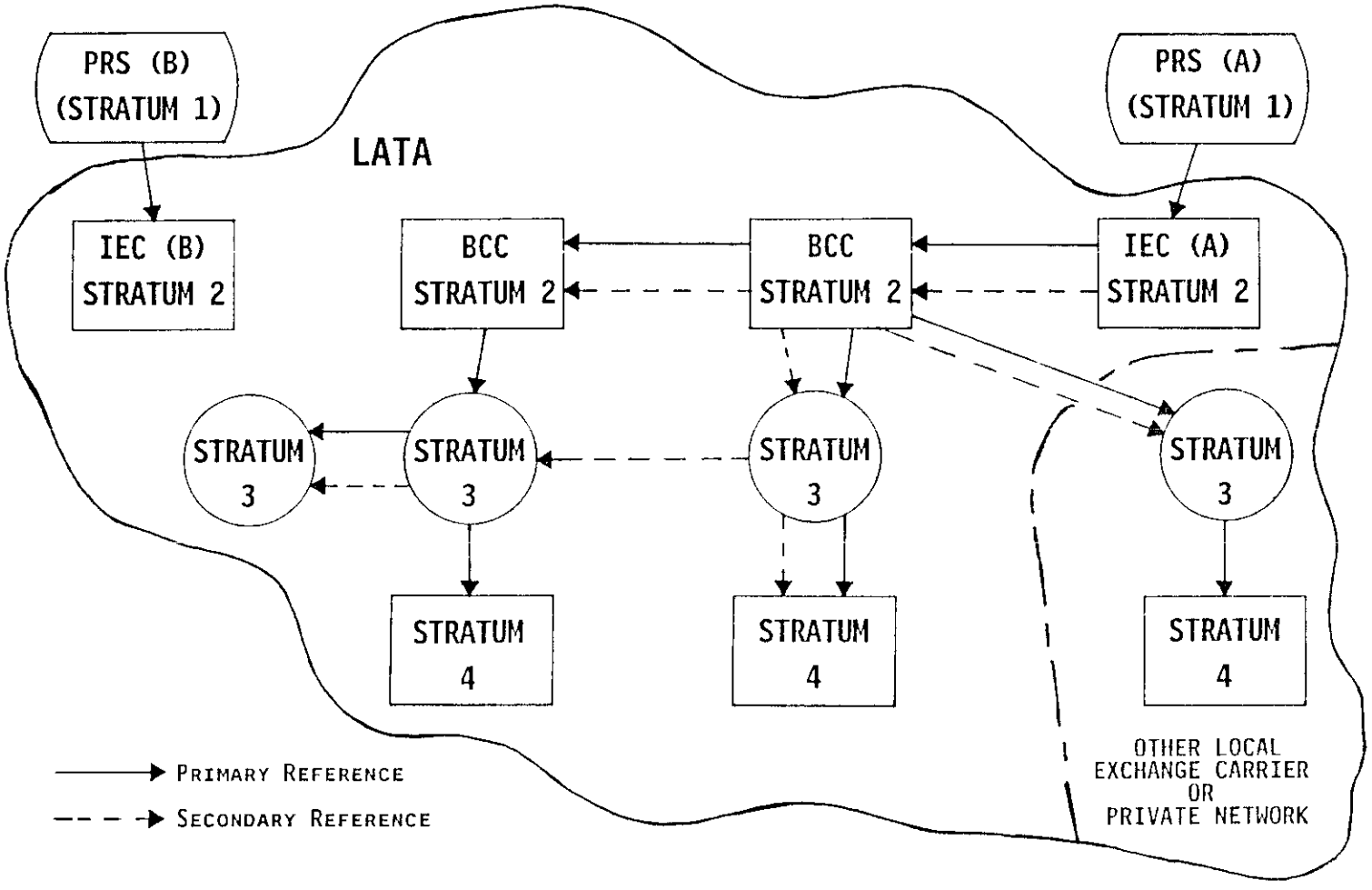
INTRA LATA SYNCHRONIZATION
(EXTERNAL SYNC REFERENCE SIGNAL)



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Pointers & Synchronous Payload Envelope

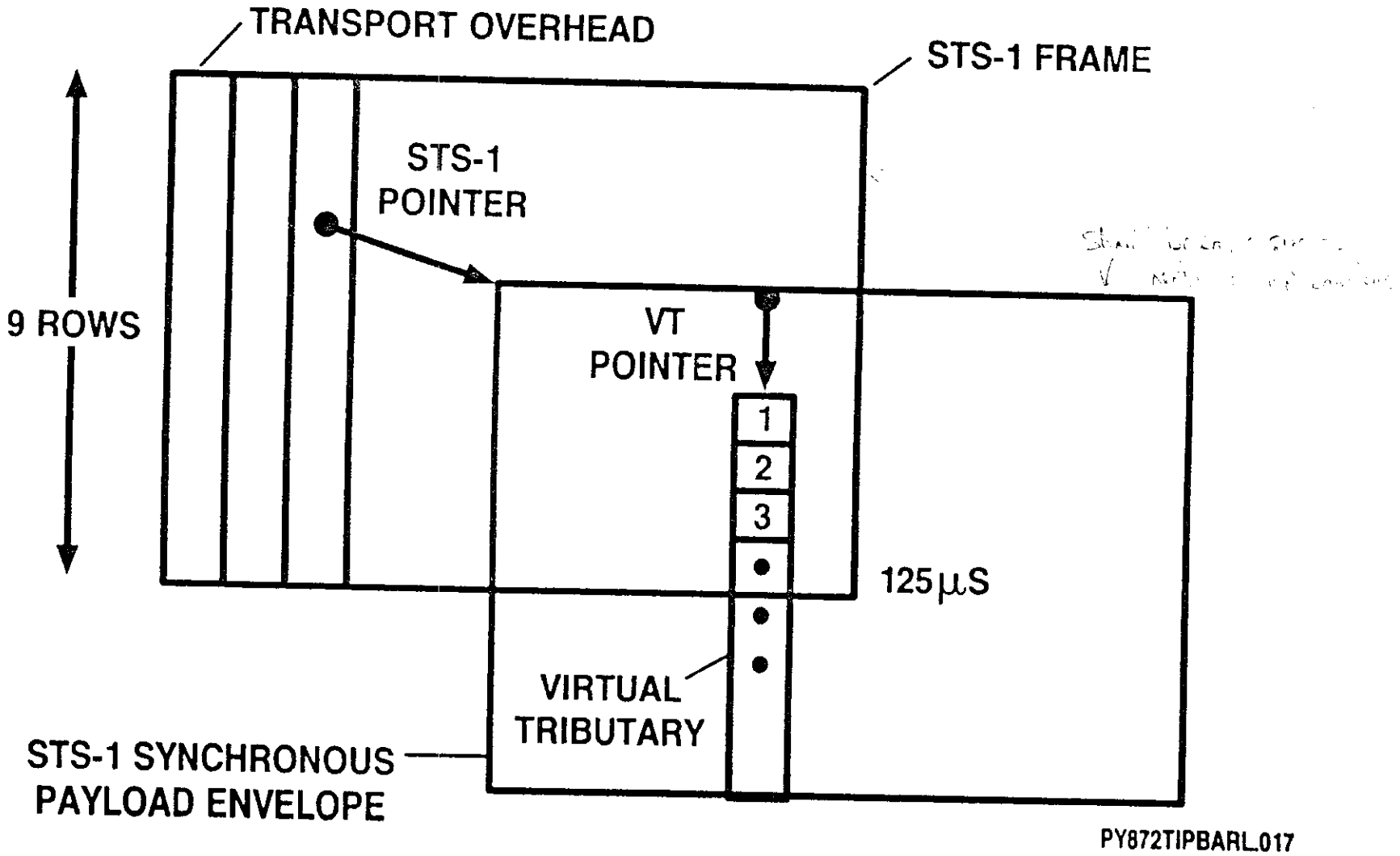

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TABLE II. Levels of the SONET Signal Hierarchy

Level	Line Rate (Mb/s)
OC-1	51.84
OC-3	155.52
OC-9	466.56
OC-12	622.08
OC-18	933.12
OC-24	1244.16
OC-36	1866.24
OC-48	2488.32

TABLE 1
THE PROPOSED DCC PROTOCOL STACK

Layer	Name	Protocol
7	Application	ISO 9595-2, 9596-2, (CMISE) X.217, X.227 (ACSE) X.219, X.229 (ROSE)
6	Presentation	X.216, X.226 X.209, (ASN.1, Basic Encoding Rules)
5	Session	X.215, X.225
4	Transport	ISO 8073, 8073 — PDAD2 (TP4)
3	Network	ISO 8473 (ISO IP)
2	Data Link	LAPD or LAPD FR
1	Physical	DCC

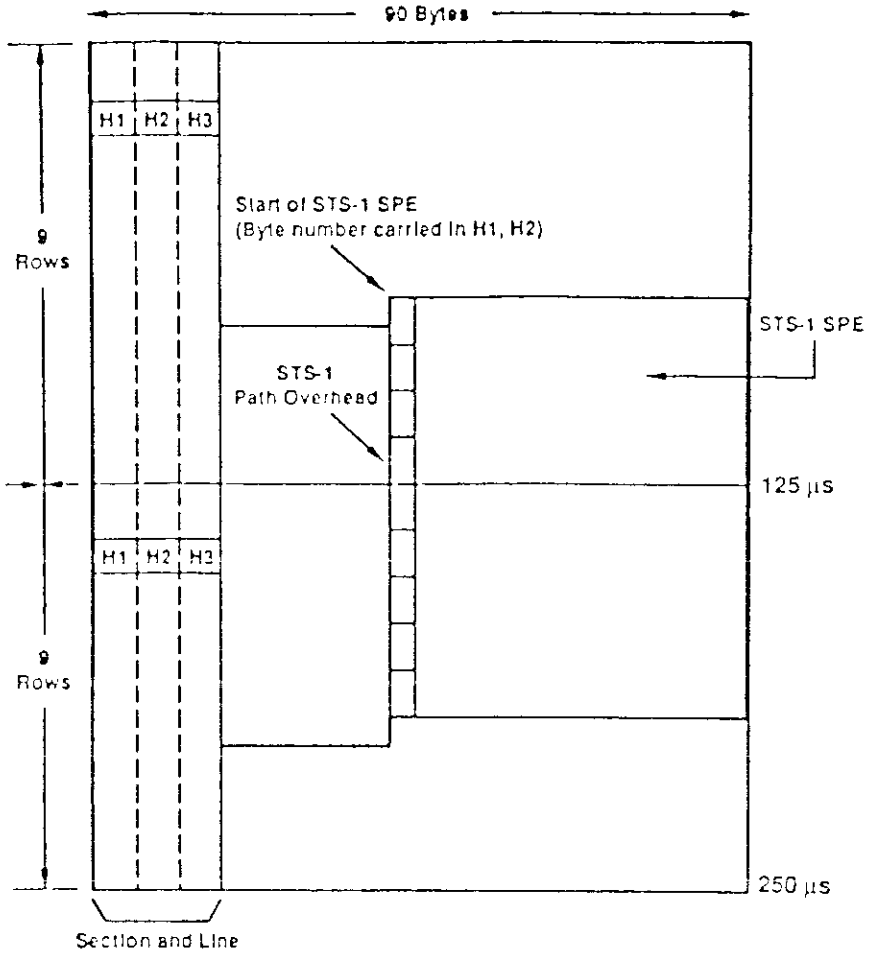
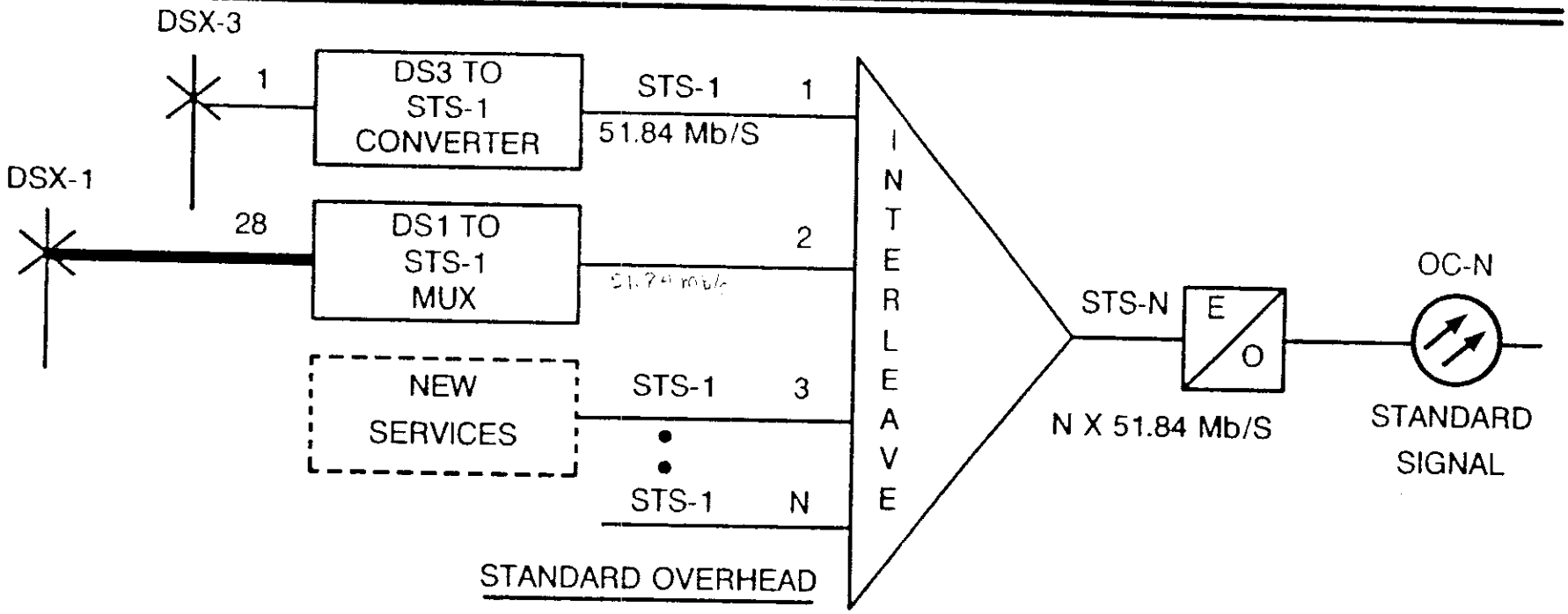


Fig. 5. STS-1 SPE in interior of STS-1 frame.

SONET Multiplexing



STANDARD OVERHEAD

FRAMING
STUFFING
PARITY CHECKING
CRAFT COMMUNICATIONS
APS SIGNALING

ADDITIONAL FUNCTIONS:
- DATA COMMUNICATIONS
- FUTURE ENHANCEMENTS