

NTA 2008

Studio signals to the Transmitter

DTV's new-age version of the STL

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Definition

- **Studio-to Transmitter-Link**
 - Used to bring
Audio and Video
Baseband signals
to the transmitter



Brief History

- **STL's began when studios separated from the Transmitter location.**
 - Colocated and Manned sites popular in the 1950's and 1960's
- **First iteration STL's were with low frequency microwave.**
 - 2 Ghz bands
- **Grew in popularity when remote controls were approved in the 1960's**
- **Microwave still the most popular**
 - 7 Ghz/13 Ghz Auxillary/ICR's

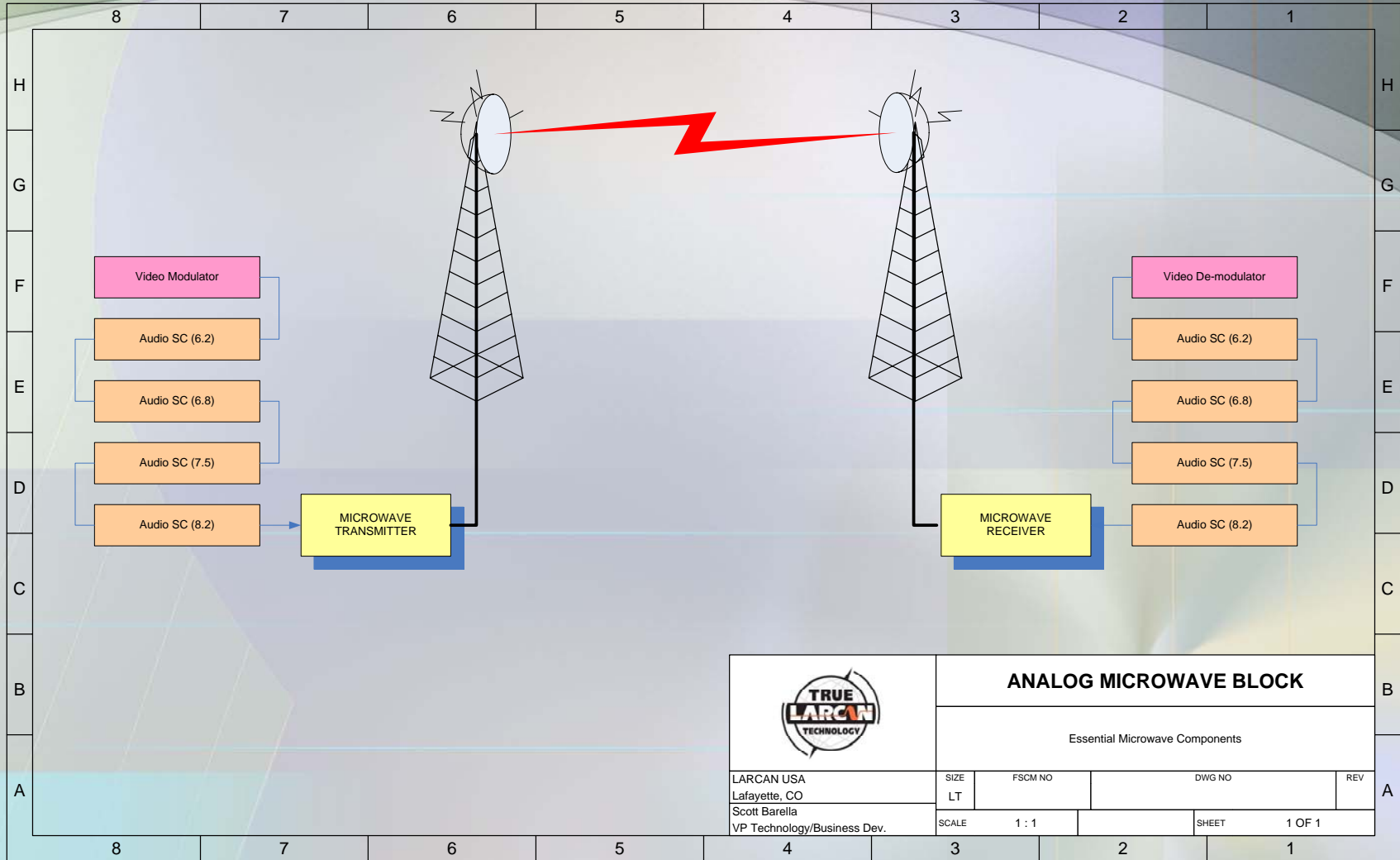
Basics


- **Baseband Video**
- **Mono Audio carried on sub-carriers**
 - 6.2 MHz
 - 6.8 MHz (Stereo)
- **Ancillary Audio added**
 - 7.5 MHz
 - 8.2 MHz
 - 5.8 MHz and others

Microwave STL

- **Studio site Transmitter**
 - Baseband signals and audio subcarriers are combined and input to the Microwave transmitter at the studio
- **Transmitter site Receiver**
 - Baseband signals are demodulated at the transmitter site and then separated from audio and video for inputs to the Transmitter

Microwave Block Diagram

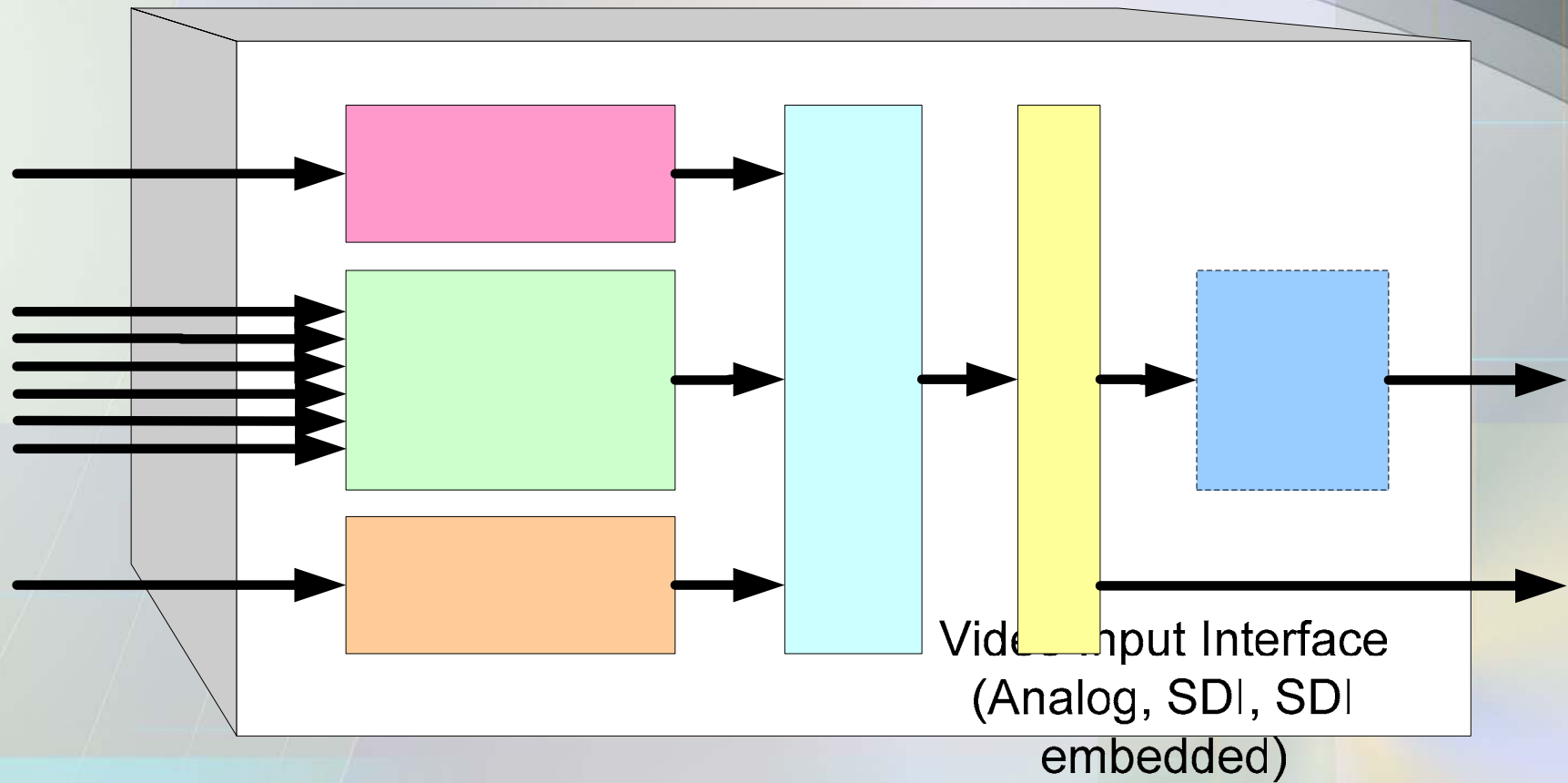


	ANALOG MICROWAVE BLOCK			
	Essential Microwave Components			
LARCAN USA Lafayette, CO Scott Barella VP Technology/Business Dev.	SIZE LT	FSCM NO	DWG NO	REV
	SCALE 1 : 1		SHEET 1 OF 1	

Digital TV ERA

- **DTV = MPEG**
- **MPEG = DATA**
- **DATA = 1 TRANSPORT STREAM (TS)**
 - Multiple Video
 - Multiple Audio
 - Multiple Data

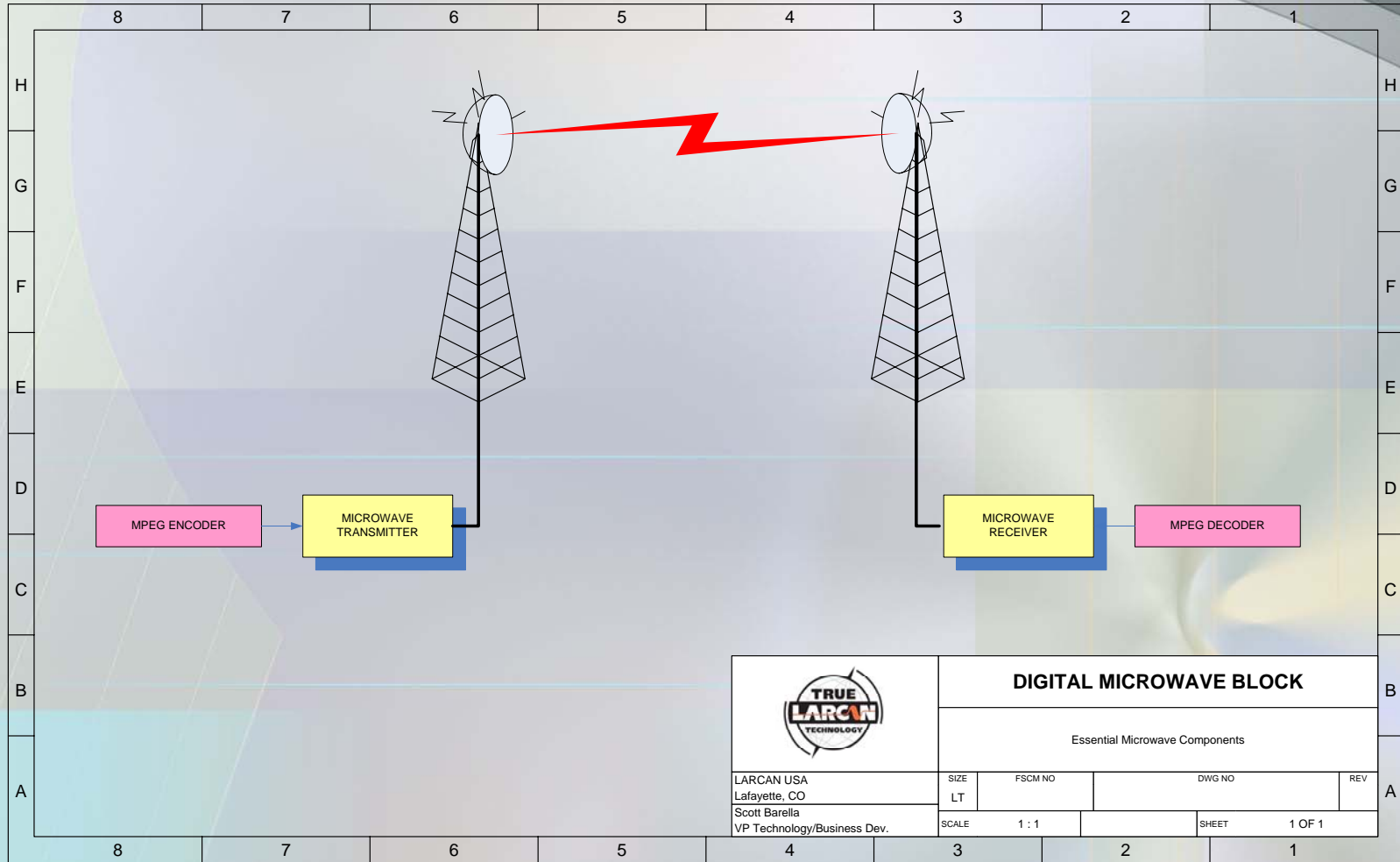
Transport Stream combines signal elements




Audio Input Interface
(Analog, AES, AC 3)

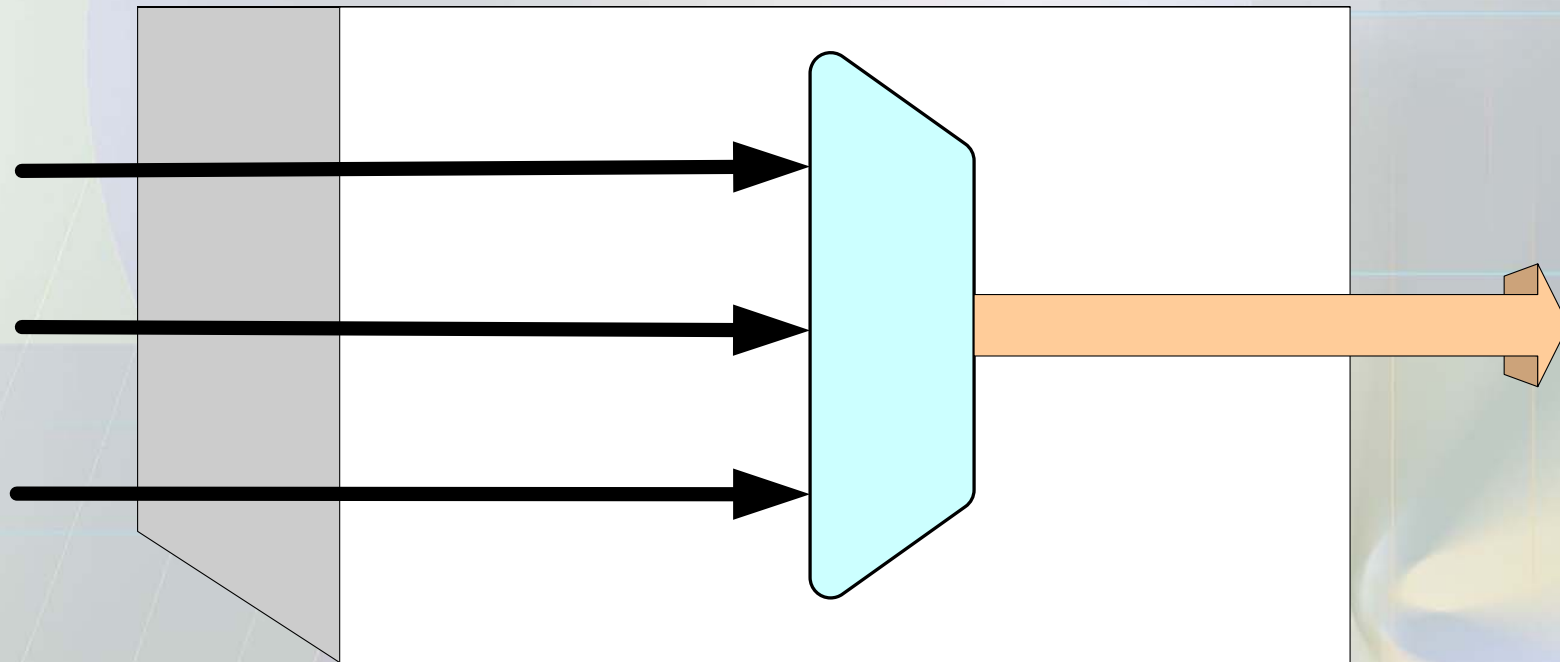
M
E

Microwave gets Simplified



	DIGITAL MICROWAVE BLOCK			
	Essential Microwave Components			
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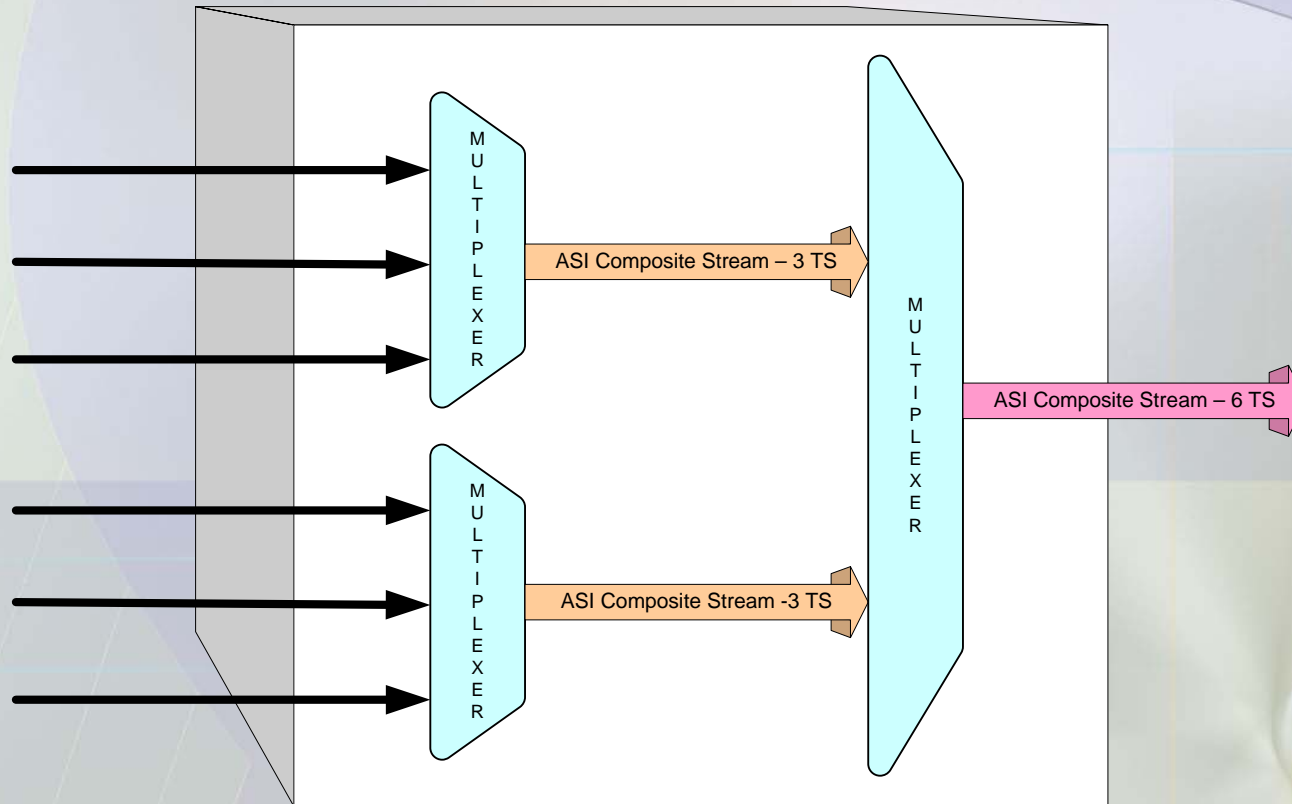
Transport Stream means combining - MUX



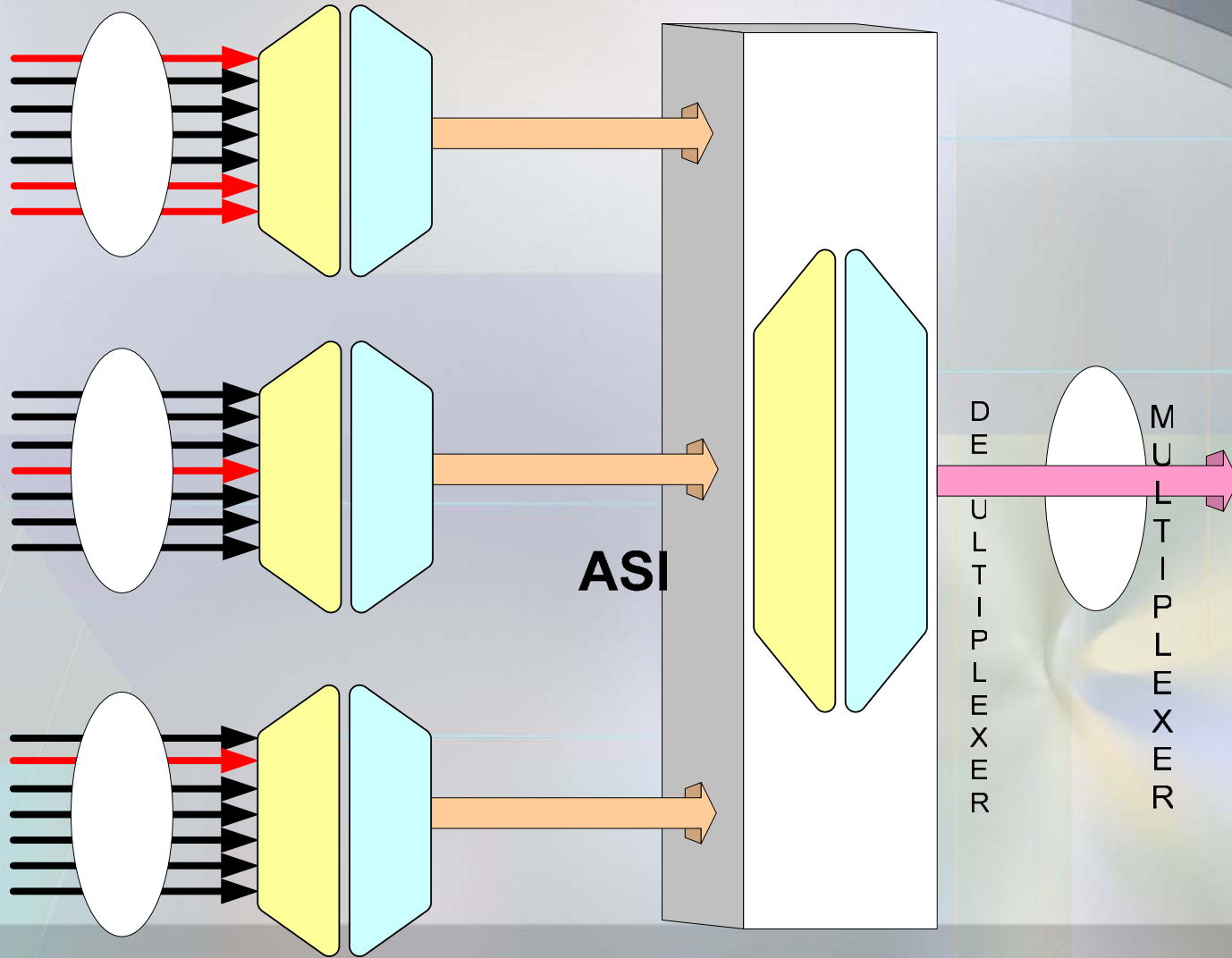
Transport Stream 1

Transport Stream 2

Aggregate signals now possible



Re-multiplexing – Grooming



DE
MULTIPLXER

M
MULTIPLXER

Fiber Types

- **Public Switched Networks**
 - **DS3 or G.703**
 - Bandwidth of 45 MB/sec (38MB effective limit)
 - Framing
 - C-Bit
 - M13
 - **Multiple T1**
 - Bandwidth of 1.5MB/Sec (1.26 effective limit)
 - Combining T1's can produce an BW economy
 - **ATM**
 - Large Sonet Network connections
- **Private Networks**
 - Also know as Dark fiber
 - Unlimited BW

Fiber methods

- **Analog conversion**
 - Analog video to optics
 - Older technology
 - Useful when ATSC encoder is at Transmitter
 - Used by some older cable headends
- **Digital conversion – ASI TS**
 - Carriage of TS

Satellite Possibilities

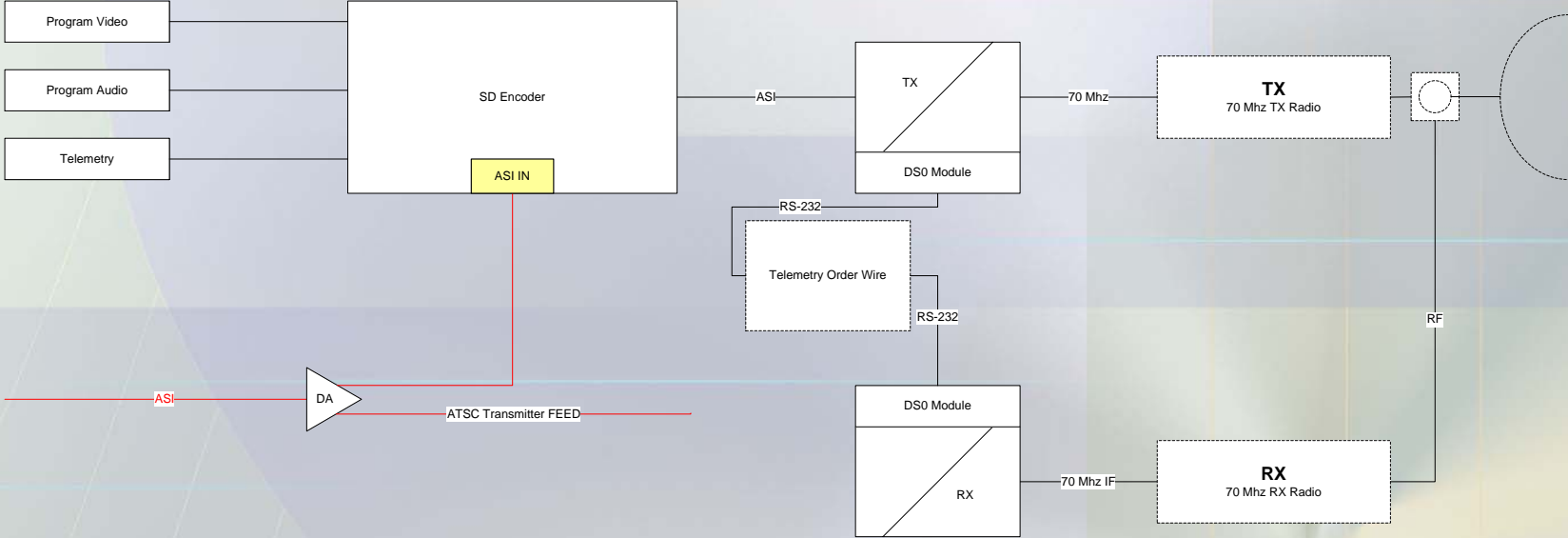
- **Downlink**

- **Some ASI programming can be used in DTV**
 - Program TS must be less than 18 MB/sec
 - Must contain Dolby AC-3 Audio
 - Must have EIA-708 Closed Captioning
 - Must be a Constant Bit Rate, not a Variable Bit Rate
- **No Spot insertion needs**
- **ASI Manipulation required**
 - Must be able to change the Program Identifiers (PID)
 - Re-muxing requirements generally involved

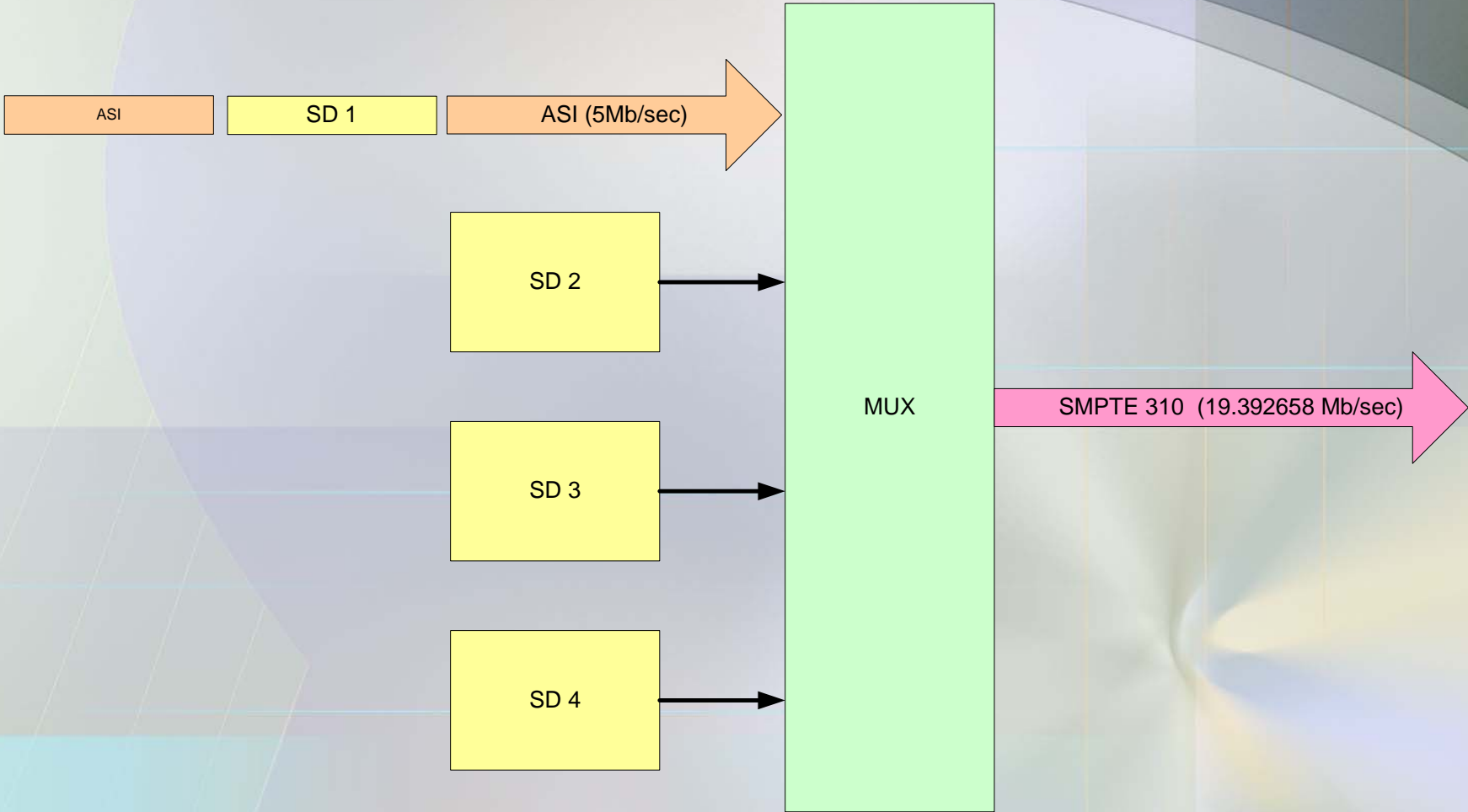
Ethernet

- **Wired**
 - 10/100 Topologies
 - Gigabit Ethernet
 - ProMPEG
- **Wireless**
 - Common non-licensed bands
 - 2.4 GHz public frequencies
 - WiFi/Bluetooth/Wireless Telephones/etc
 - 5.8 GHz public frequencies

Hybrid Solutions

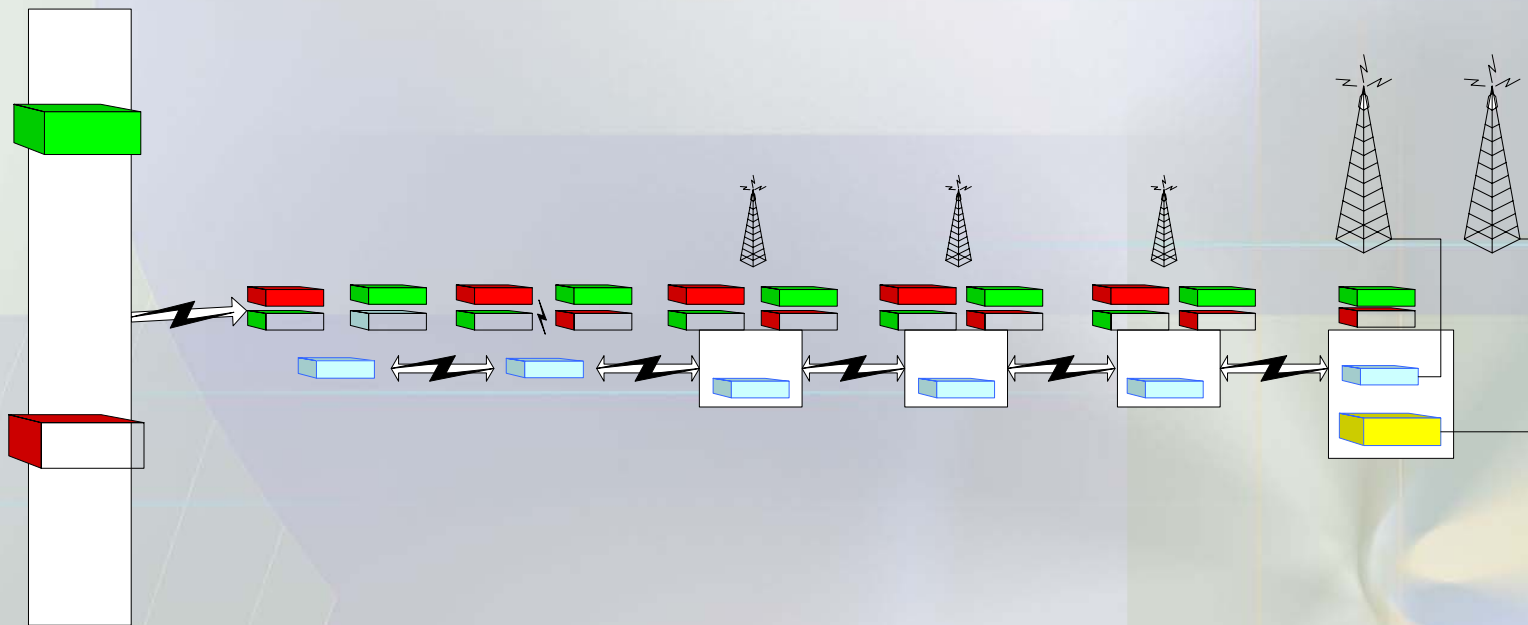


More Hybrid Solutions



Even more Hybrid Solutions

- Mixture of Microwave, Fiber, Satellite and Ethernet



Digital - TX 2 Program Channels

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- **Thanks!**

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