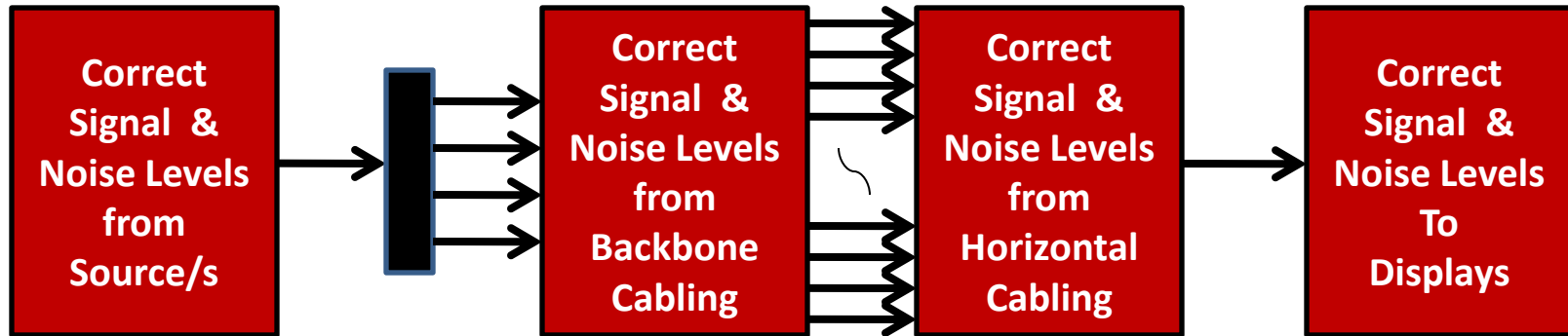




RF Video Distribution System

Why Z-Band is "The Right Choice for Quality Video"

Requirements for Quality RF Video



*“Quality from Headend to Display
In a Building, Campus, or Metropolitan Area”*

RF Video System Elements

• Video Sources

- CATV - Direct Feed or Headend (Analog and Digital QAM)
- Off Air – (Digital ATSC 8VSB – Headend Required)
- Satellite – 2+GHz (Headend Required)
- Internally Generated – (IP Camera/Server/Modulator)
- Digital Signage – (IP Server/Modulator)

• Backbone Cabling

- RG6 Coax – 400' Maximum
- RG11 – 600' Maximum
- Single-Mode Fiber – SC/APC Connector Required – Distance Depends on Laser Power/Cable/Splice & Connector Loss/Splitter Loss

• Horizontal Cabling

- Coax – Home Run/Trunk & Tap/Amplifiers/Couplers
- TIA 568 Twisted Pair (UTP) Cat 6 or Better – 100 Meters Maximum

• Display

- HDTV – Direct Connection to Horizontal Cabling (BALUN Required for UTP)
- Interactive System Computer - Direct Connection to Horizontal Cabling (BALUN Required for UTP)

“Quality Source – Quality Distribution – Quality Display”

RF Video Source - CATV

- Raw Feed:

- May be Analog, SD and/or HD
- “Premium Channels” are Typically encrypted (Pro idiom or Proprietary)
 - “Premium Channels” may mean all HD Channels or only those Channels that require additional subscription charges ie HBO, Cinemax, etc.
 - Set Top Box typically required at all TV’s for “Premium Channels”
- Cable Provider must be asked to provide all Analog and Digital Channel Signal levels Flat with the Digital 3 to 6 dBmV less than the Analog.

- Headend:

- Clear QAM (non-encrypted) is required in order receive on a standard digital TV with out a STB
- Set Top Box, at the Headend, required for each Channel
- “Premium Channels” may also be HDCP (High Bandwidth Digital Content Protection; commonly called Hi-Def Copy Protection) encrypted at the HDMI output and, if so, they can not be Modulated at the Headend Component
- Composite, or RGB Output can be Modulated at the Headend; if these Outputs are not available, “Premium Channels” can not be Modulated

RF Video Source – Off Air

- Raw Feed:

- May be SD or HD
- ATSC, 8VSB
- Digital Signal Levels must be 17 to 20dBmV Flat
 - **The Levels of the channels coming off the Antenna/s will vary significantly. Therefore, a raw feed is discouraged in favor of a Headend**

- Headend:

- A Transcoder (digital channel processor) is used to establish consistent signal levels for Video Distribution

RF Video Source – Satellite

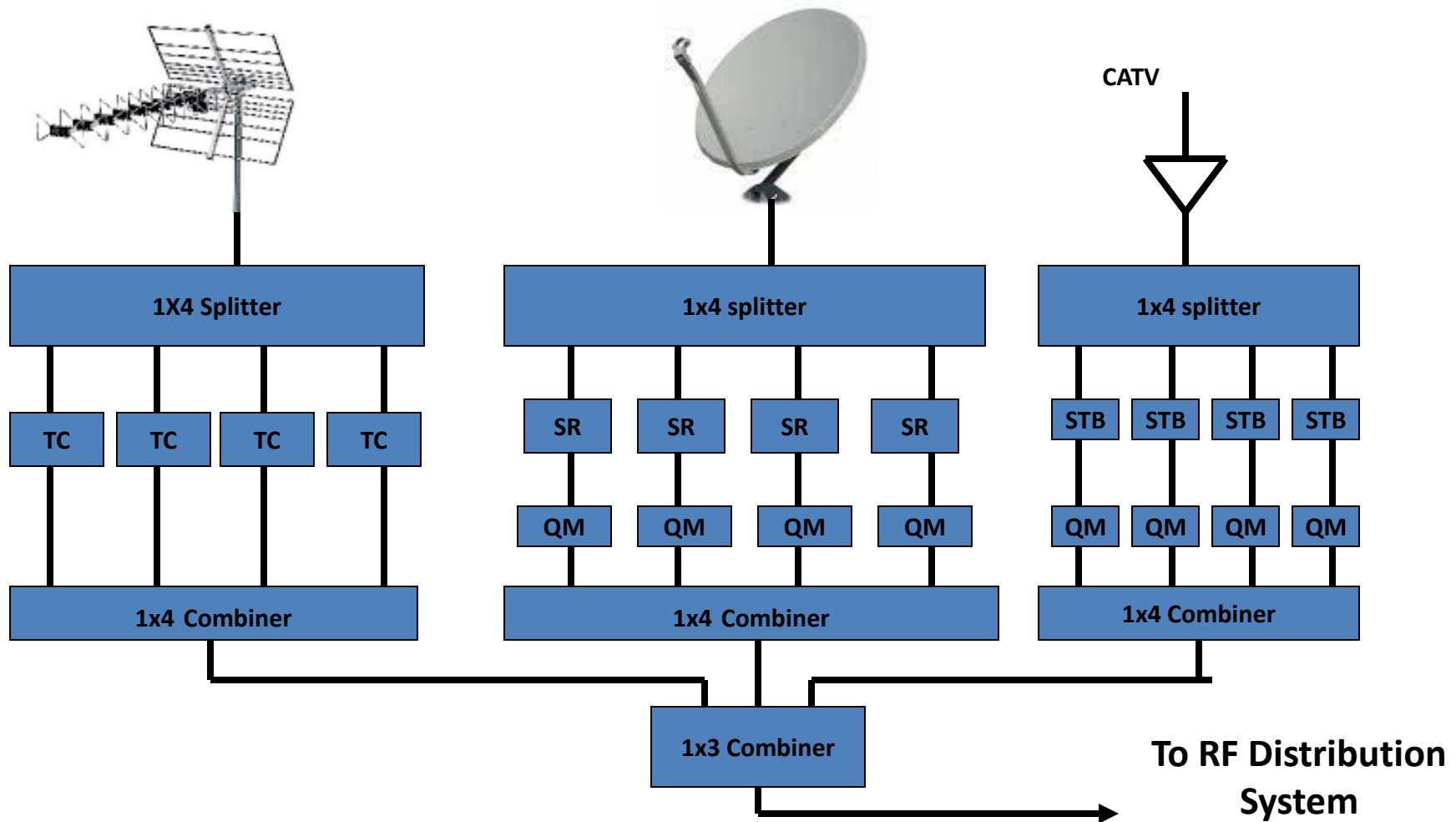
• Raw Feed:

- May be SD or HD
 - **The channels coming off the Satellite Dish are QPSK (Quadrature Phase Shift Keying) at 2 to 2.4 GHz. Therefore, a raw feed can not be transported over TIA 568 Cabling**
- All HD Channels are typically Pro Idiom encrypted (Direct TV)

• Headend:

- Clear digital signal (non-HDCP encrypted) is required in order to Modulate Digital Channels
- Digital Signal out of headend must have a MER (digital) CCN (analog) Levels within the requirements of the distribution and receiving devices.
- Either a Satellite Receiver is required for each Channel or the *Technicolor Comm 1000 (or similar device)* may be used.
- “Premium Channels” may also be HDCP (High Bandwidth Digital Content Protection; often referred to as HD Copy Protection) encrypted at the HDMI Output and, if so, the HDMI output can not be Modulated at the Headend
 - Component, Composite, or RF Output can be Modulated at the Headend; if these Outputs are not available, “Premium Channels” can not be Modulated.

RF Video Source – Combined Headend

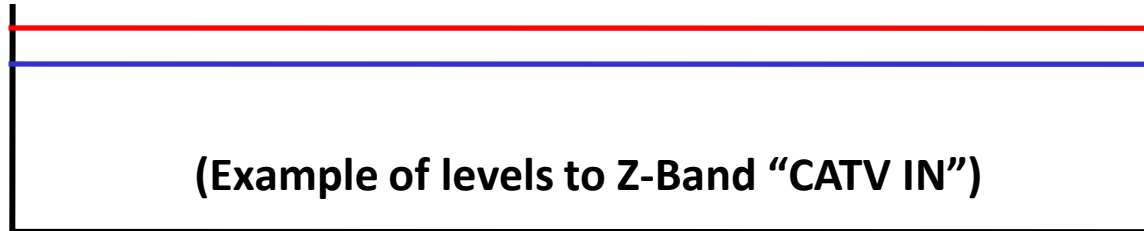


Champaign/Urbana	Urbana	27	26	WCCU	Fox	satellite of WRSP-TV ch. 55 Springfield
Charleston	Charleston	51	50	WEIU-TV	PBS	
Chicago	Chicago	2	12	WBBM-TV	CBS	
Chicago	Chicago	5	29	WMAQ-TV	NBC	
Chicago	Chicago	7	44	WLS-TV	ABC	
Chicago	Chicago	9	19	WGN-TV	CW	
Chicago	Chicago	11	47	WTTW	PBS	
Chicago	Chicago	20	21	WYCC	PBS	
Chicago	Chicago	26	27	WCIU-TV	Ind.	
Chicago	Chicago	32	31	WFLD	Fox	Ind. (1954-1986)
Chicago	Chicago	38	43	WCPX-TV	ION	
Chicago	Chicago	44	45	WSNS-TV	TEL	
Chicago	~Gary IN	50	51	WPWR-TV	MNT	
Chicago	Aurora	60	50	WXFT-DT	TF	
Chicago	~Hammond IN	62	36	WJYS	Ind.	
Chicago	Joliet	66	38	WGBO-DT	UNI	
Decatur	Decatur	17	18	WAND	NBC	
Decatur	Decatur	23	22	WBUI	CW	
LaSalle	LaSalle	35	10	WWTO-TV	TBN	
Macomb	Macomb	22	21	WMEC	PBS	satellite of WSEC ch. 14 Springfield
Mount Vernon	Mount Vernon	13	21	WPXS	Ind.	
Olney	Olney	16	19	WUSI-TV	PBS	satellite of WSIU-TV ch. 8 Carbondale
Peoria	Peoria	19	19	WHOI	ABC	
Peoria	Peoria	25	25	WEEK-TV	NBC	
Peoria	Peoria	31	30	WMBD-TV	CBS	

RF Video Source Levels to Distribution

RF Signal Levels from the Source should *always* be set as flat as Possible

23dBmV, C/N >43
17dBmV, MER >36



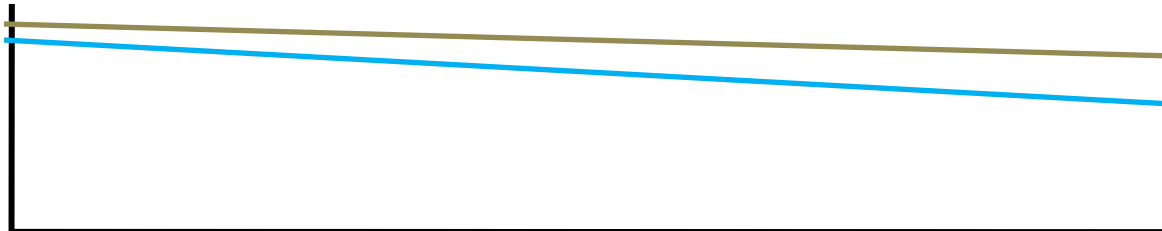
Analog

Digital

54MHz ← Frequency → 860MHz

Copper Distribution Media will attenuate and slope the RF Video Signal Levels

Signal Power
At 100'

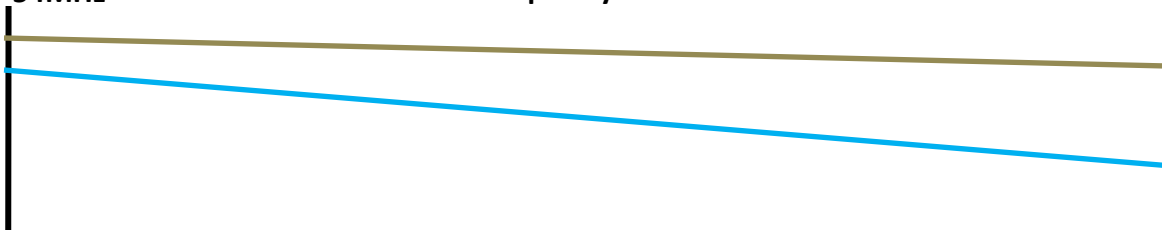


Coax

UTP

54MHz ← Frequency → 860MHz

Signal Power
At 250'

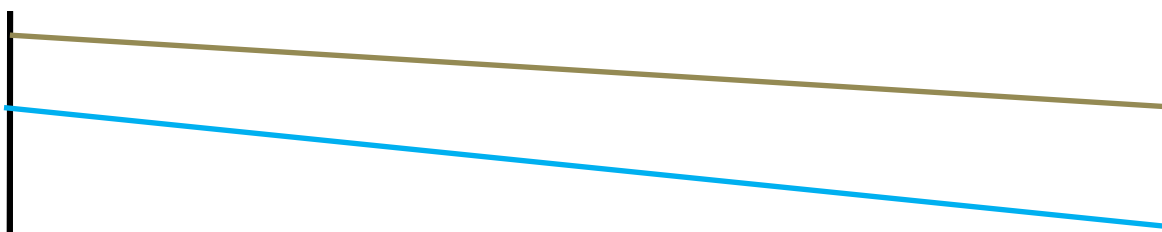


Coax

UTP

54MHz ← Frequency → 860MHz

Signal Power
At 300'

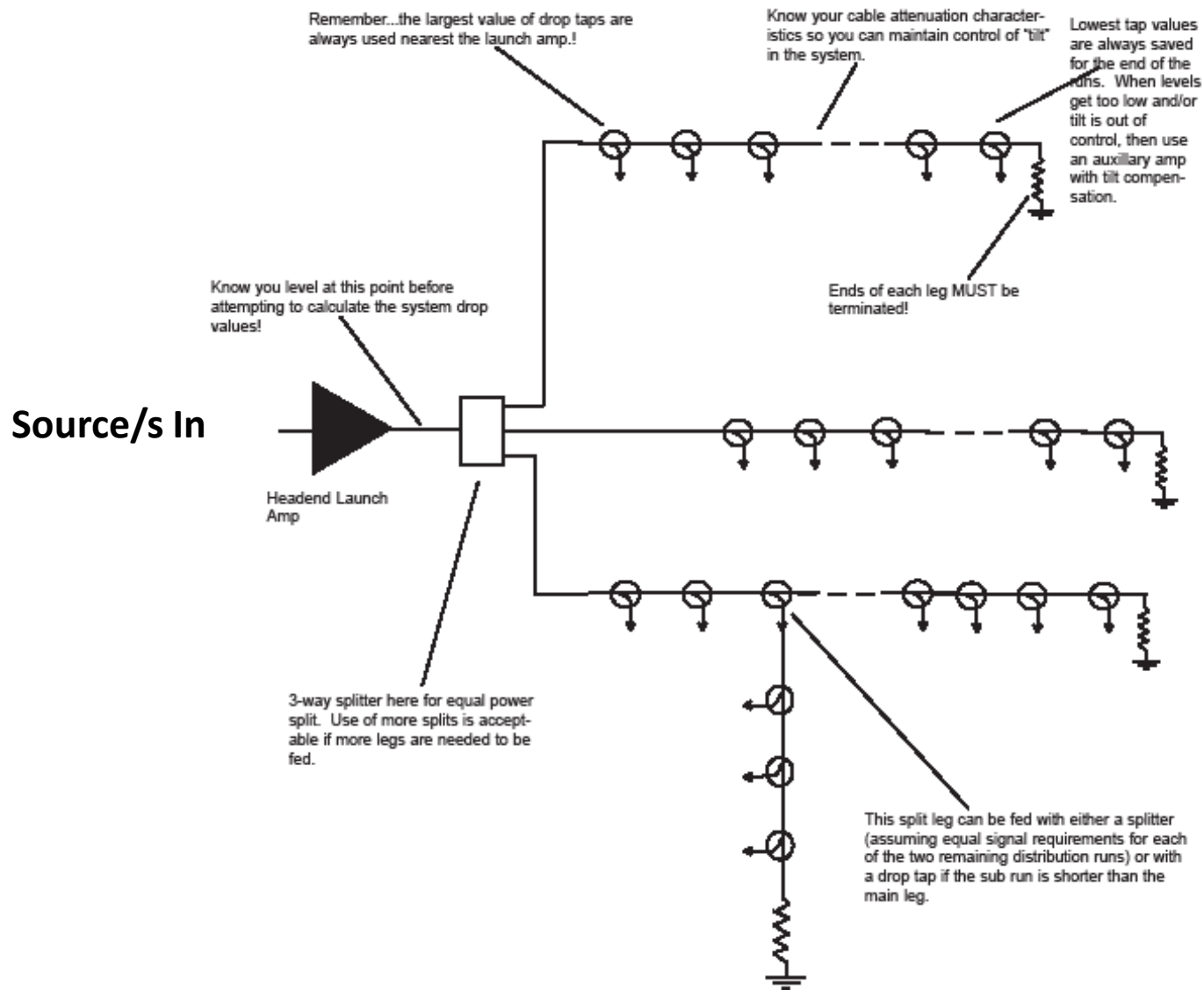


Coax

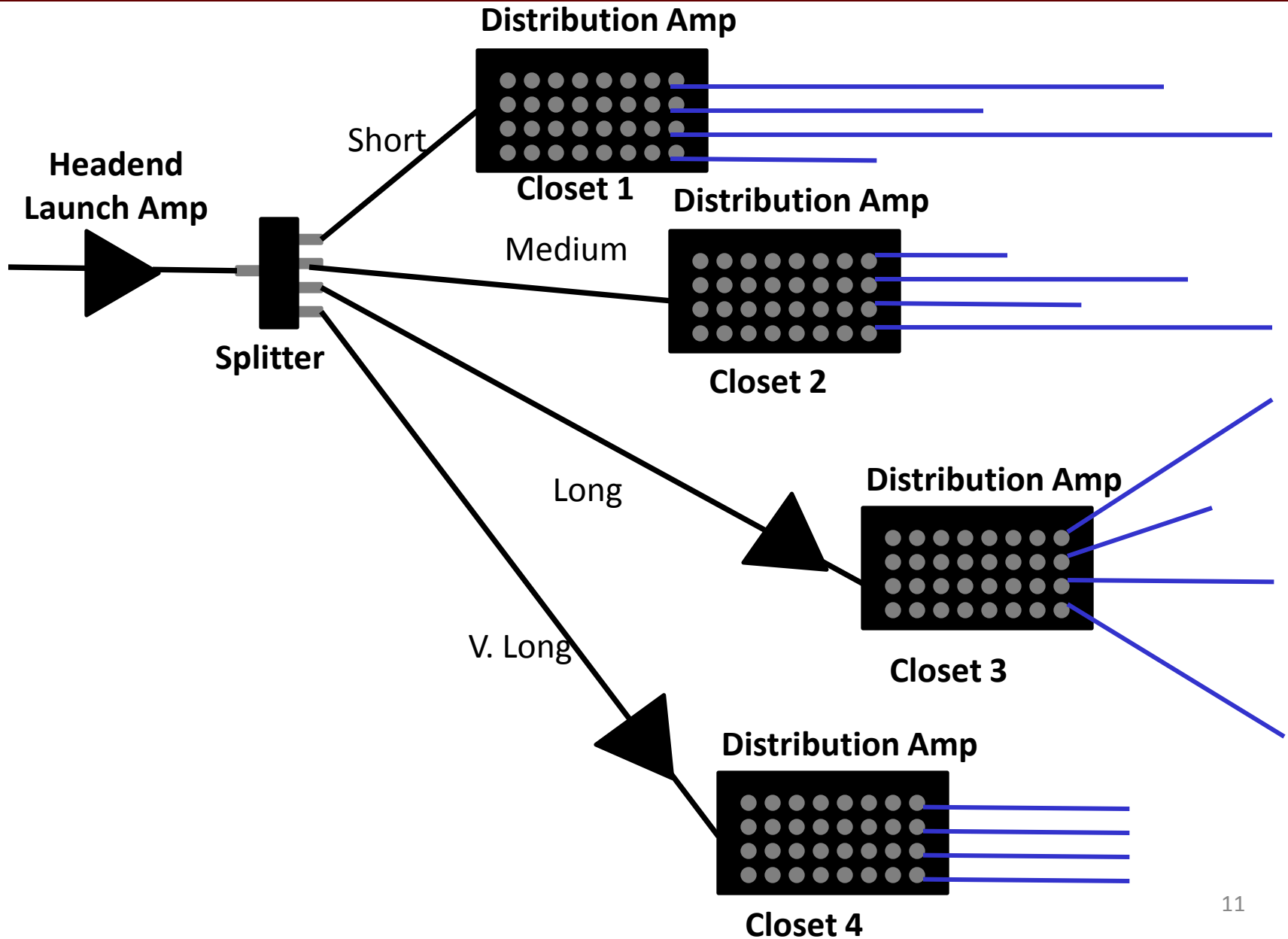
UTP

54MHz ← Frequency → 860MHz

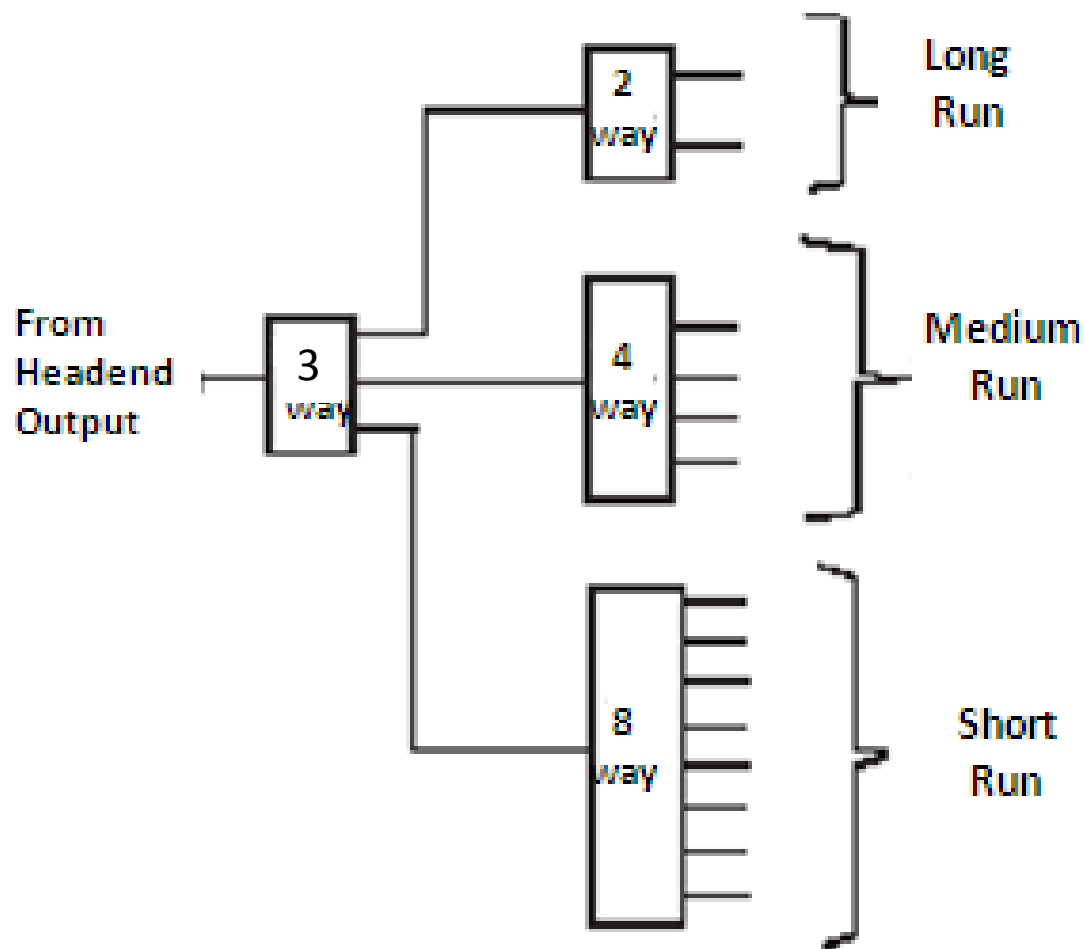
Distribution – Trunk & Tap Coax



Distribution – Homerun Coax



Distribution – Coax



*Add a Passive Balun function and
what do you have?*

LYNX

***Coax is Difficult to Design/Maintain & Requires On-going Loss
Analysis and Manual Adjustments for any Moves/Add/Changes***

What Is the Solution?

Z-Band Light Fiber Backbone, Intelligent Automatic Gain Technology, and Structured Cabling with Known and Consistant Performance Characteristics

- TIA 568 – Provides the Structured Cabling Requirements and Limits resulting in *Known and Constant* Performance Characteristics
- Z-Band Video – Provides the Intelligent Automatic Gain Control (*GigaBUD and GigaBOB*) and *Z-Band Light* to Eliminate Signal Level Slope issues
- The Combination of TIA 568 and Z-Band Video - Provides Simplified Design, Installation and Maintenance with Plug-n-Play Moves/Adds/Changes

***“Quality Distribution from Headend to Display
In a Building, Campus, or Metropolitan Area”***

IT – Structured Cabling Terminology

As Defined by TIA 568:

- **Building Entrance** - The point at which outside cabling enters a building. Often known as the MDF (Main Distribution Frame) and is usually the demarcation point for outside services.
- **Equipment Room** - Storage area for the more expensive, complex equipment, often the existing telecommunications closets. Often known as the IDF (Intermediate Distribution Frame) or the TR (Telecommunications Room) and is the point at which the Backbone Cabling Interfaces to the Horizontal Cabling through Electronic Equipment and Patch Panels.
- **Backbone Cabling** - Cabling (often incorrectly referred to as vertical) that carries the signals from equipment room to equipment room, between floors, and to and from the building entrance connections. May be Fiber or Coax for RF Video.
- **Horizontal Cabling** - Transmission media that carries signals from a **same floor** equipment room to the various work areas. May be Coax or Twisted Pair for RF Video.
- **Work Area** - Any area where the computer workstations, printers, TV's, etc. are located, typically Office Space, Patient Room, Guest Room, Classroom, etc..

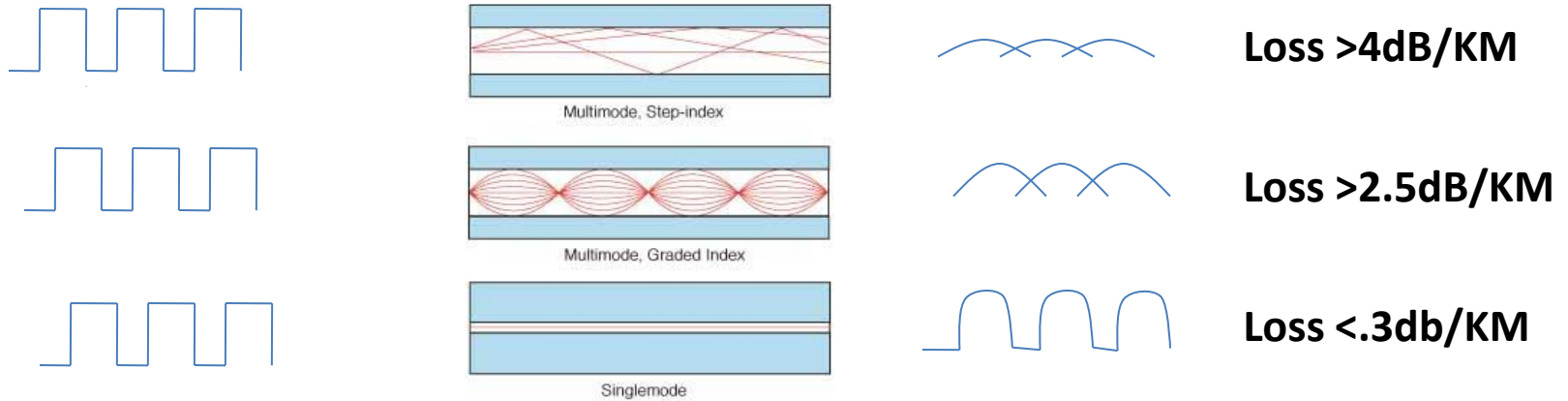
Z-Band Video – Backbone Solutions



- **Z-Band Light** – Maintains the Video Signal Quality in the Backbone; from the Source in a MDF to IDF's in the same or other Building/s.
 - Requires Singlemode Fiber and SC/APC (APC = Angle Polished Connector) connectors and fusion splices to eliminate the modal dispersion of multimode fiber and the back reflection of non-APC connectors and mechanical splices.
 - The Flat Signal Levels from the Source remains Flat to the Fiber Receiver/s in the other Closets and/or Buildings which eliminates the complexity of manual adjustments.
 - Has a 10dB dynamic range for the input from the Source and can adapt to signal level variations of +5dB and -5dB with no disruption of Video Quality.

Z-Band Video – Fiber Backbone

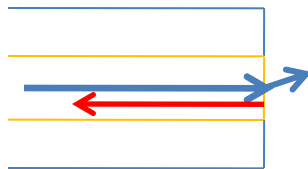
•Why Singlemode Fiber:



Low Loss and no Modal Dispersion

•Why APC Connectors:

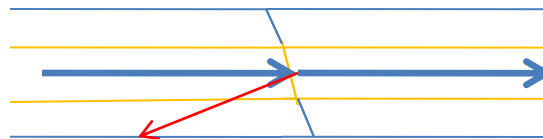
Light Bends & Reflects when The Index of Refraction Changes



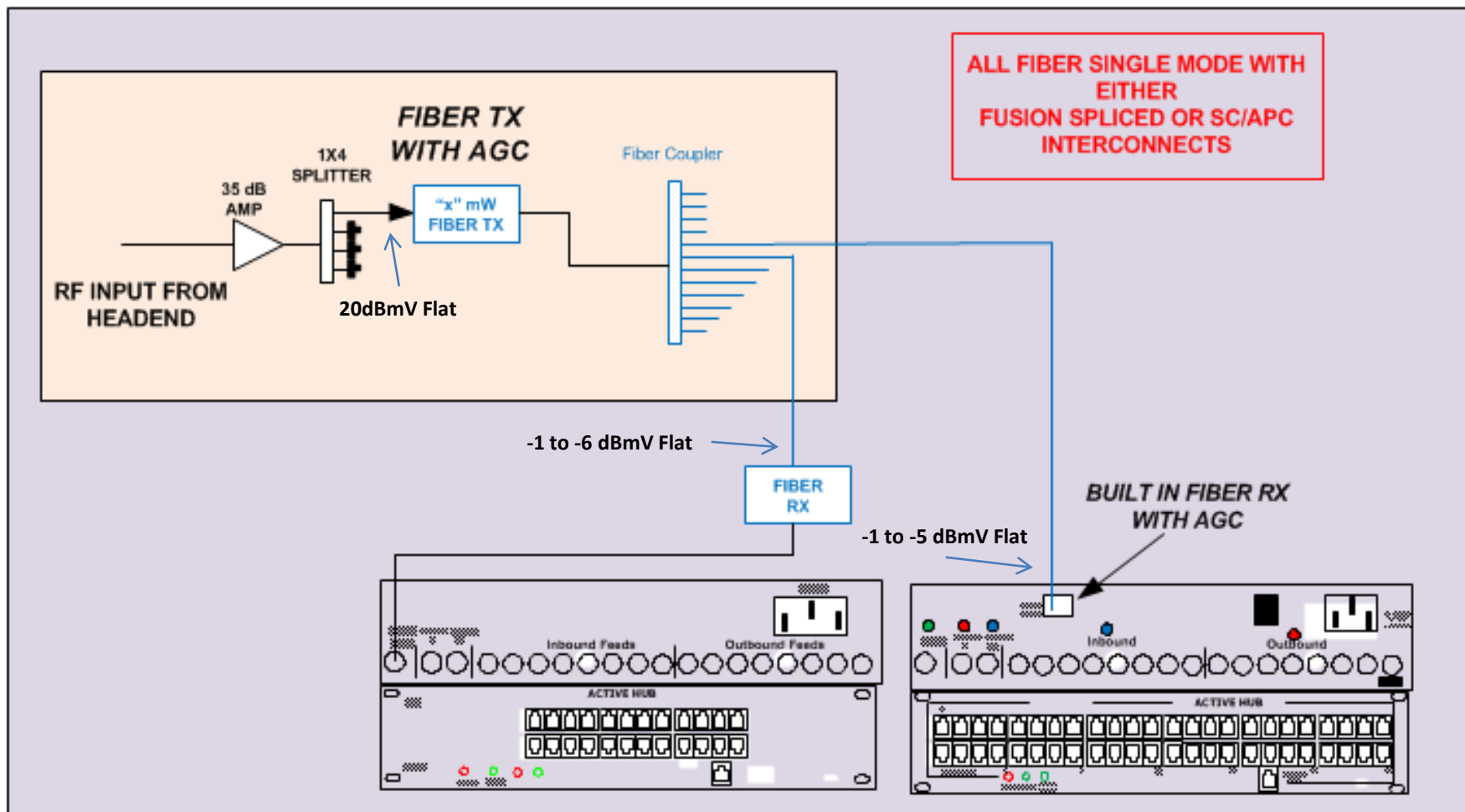
PC (Physical Contact) Connector provides Less Reflection but Some Signal Distortion Occurs



APC (Angle Polished) Connector Results in any Reflection Going out of the Core to Minimize Signal Distortion

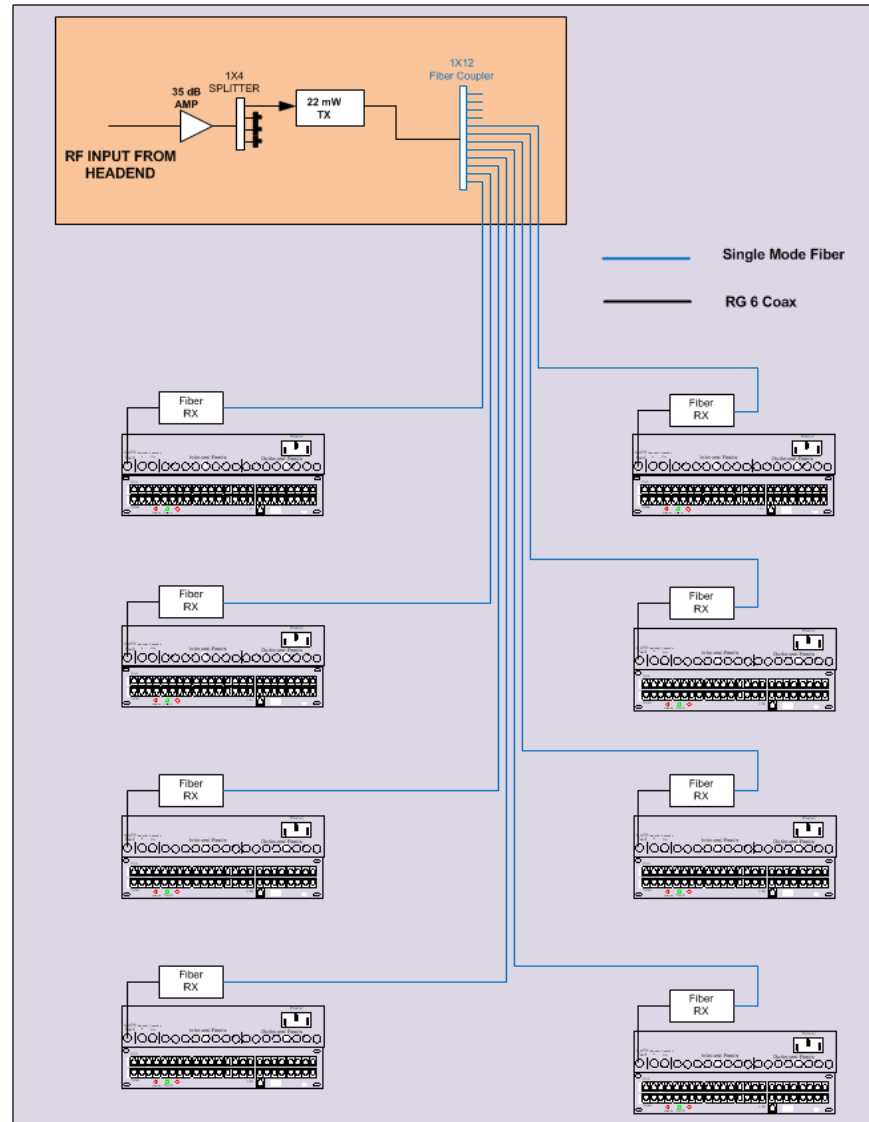


Single-mode Fiber Backbone



***“Engineered for Consistent Quality.....
In a Building or Throughout a Campus”***

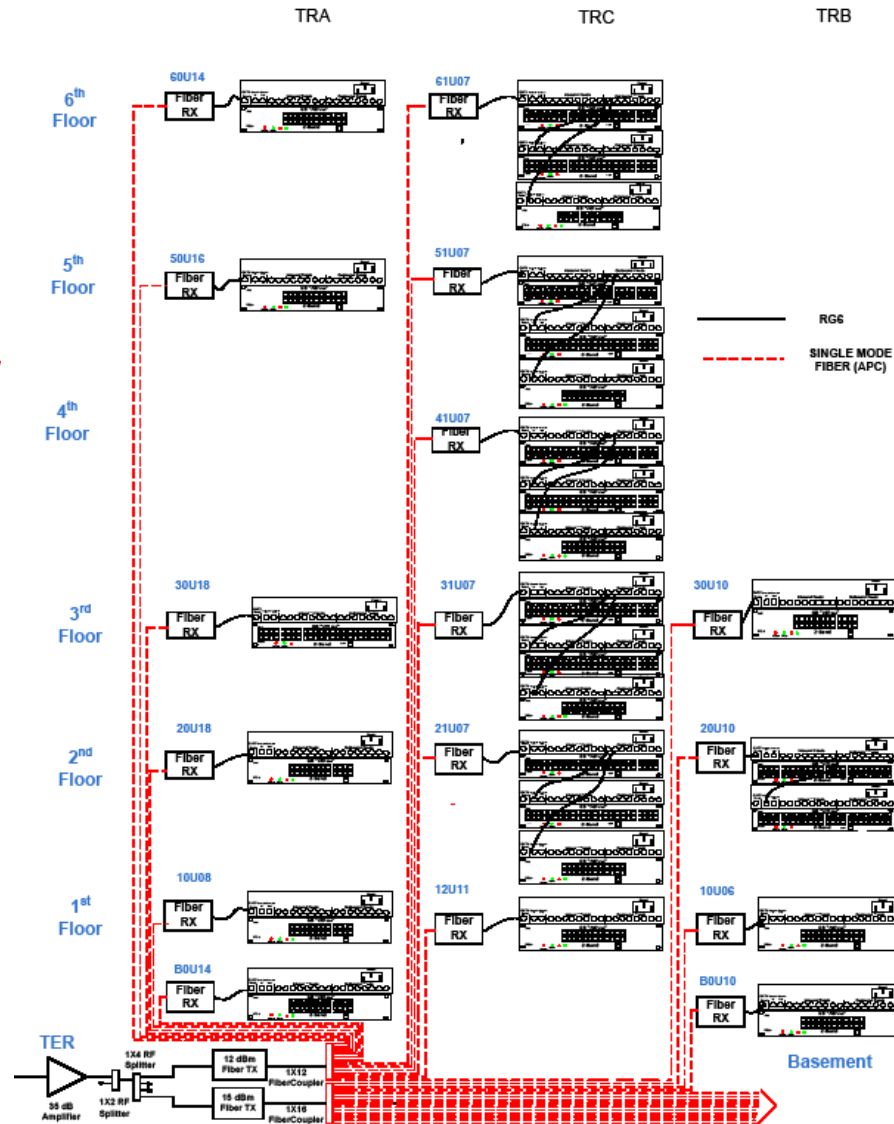
Single-mode Fiber Backbone



“Fiber to Every Closet – Ready for Tomorrow”

Single-mode Fiber/Coax Backbone

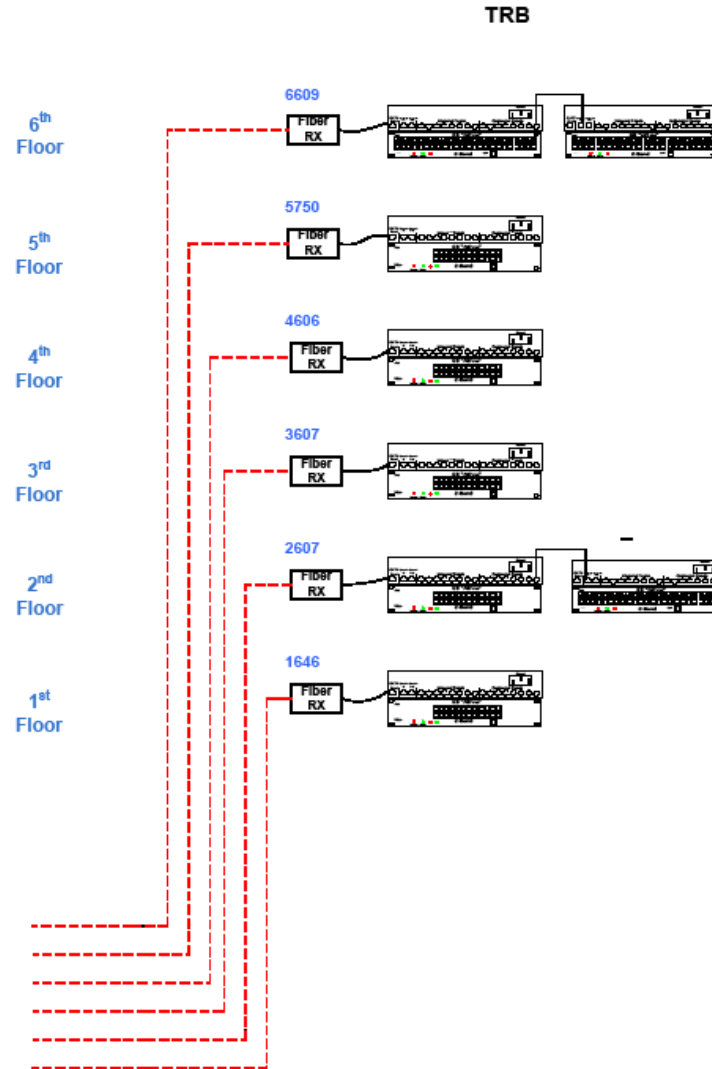
Main Building



“Single-mode Campus Backbone”

Single-mode Fiber/Coax Backbone

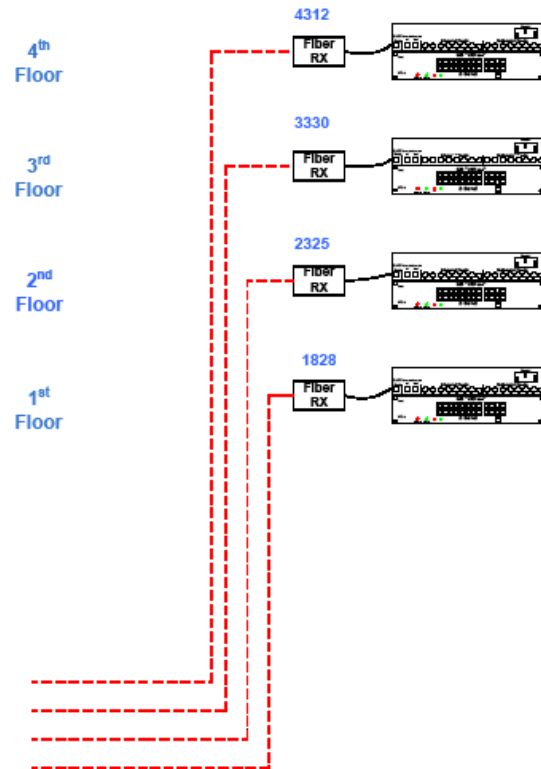
Building 2



“Single-mode Campus Backbone”

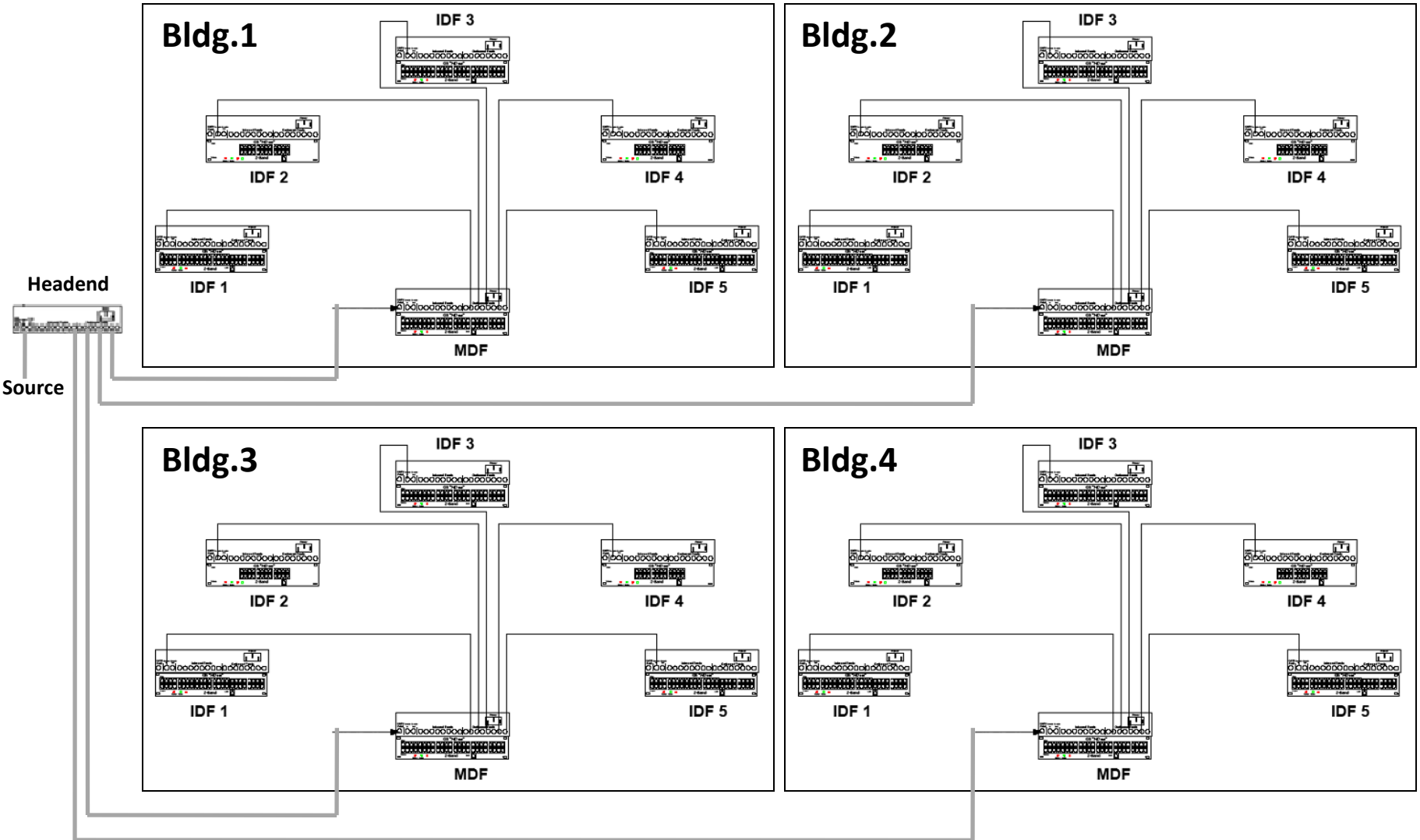
SM Fiber/Coax – Campus Backbone

Building 3



“Single-mode Campus Backbone”

Coax Backbone



RG6 <400'

RG11 <600'

“Quality Video to Every Closet”

What does Z-Band Provide?

- ***High Quality Video Distribution Solutions that are Easy to Design, Easy to Install, Easy to Maintain, and Adjustment Free Plug-n-Play Adds/Moves/Changes***
- ***Fiber Backbone to assure Quality Video to Every Building and/or Closet***
- ***Active, Automatic Gain Technology in the GigaBUD Video Hub to assure Quality Video over a Coax Backbone in or Between Buildings up to 600' apart***
- ***Active, Automatic Gain Technology in the GigaBOB Intelligent Balun to assure Quality Video to every Display over TIA 568 Category 6 Cable***

***Quality RF Video Source to Display
In a Building, Campus, or Metropolitan Area***