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GLOBAL SERVICES
Technical Bulletin

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Date: 03/02/2001 Bulletin #010205A
To: Distribution
From: Dinh, Wayne
Subject: Sensornet Protocol (REVISED)

The purpose of this technical bulletin is to help the field service personnel to understand Sensornet protocol. Understanding how Sensornet devices and repeaters are terminated will allow the network to work according to design. Incorrect configuration of a Sensornet network will result in programming and control problems. This bulletin will cover:

1. Sensornet Protocol rules
2. Defining devices and repeaters
3. Sample Sensornet configurations
4. Sample of Invalid Configuration
5. Cable Specifications

1: SENSORNET PROTOCOL RULES

1. A maximum of 32 devices in each Sensornet link
2. A maximum of 4 repeaters in the path of any 2 devices in a network
3. Each Sensornet link has a maximum of 1 kilometer (approximately 3300 feet)
4. Always 2 terminations in a backbone configuration, one at each end
5. A maximum of 4 terminations in a star configuration

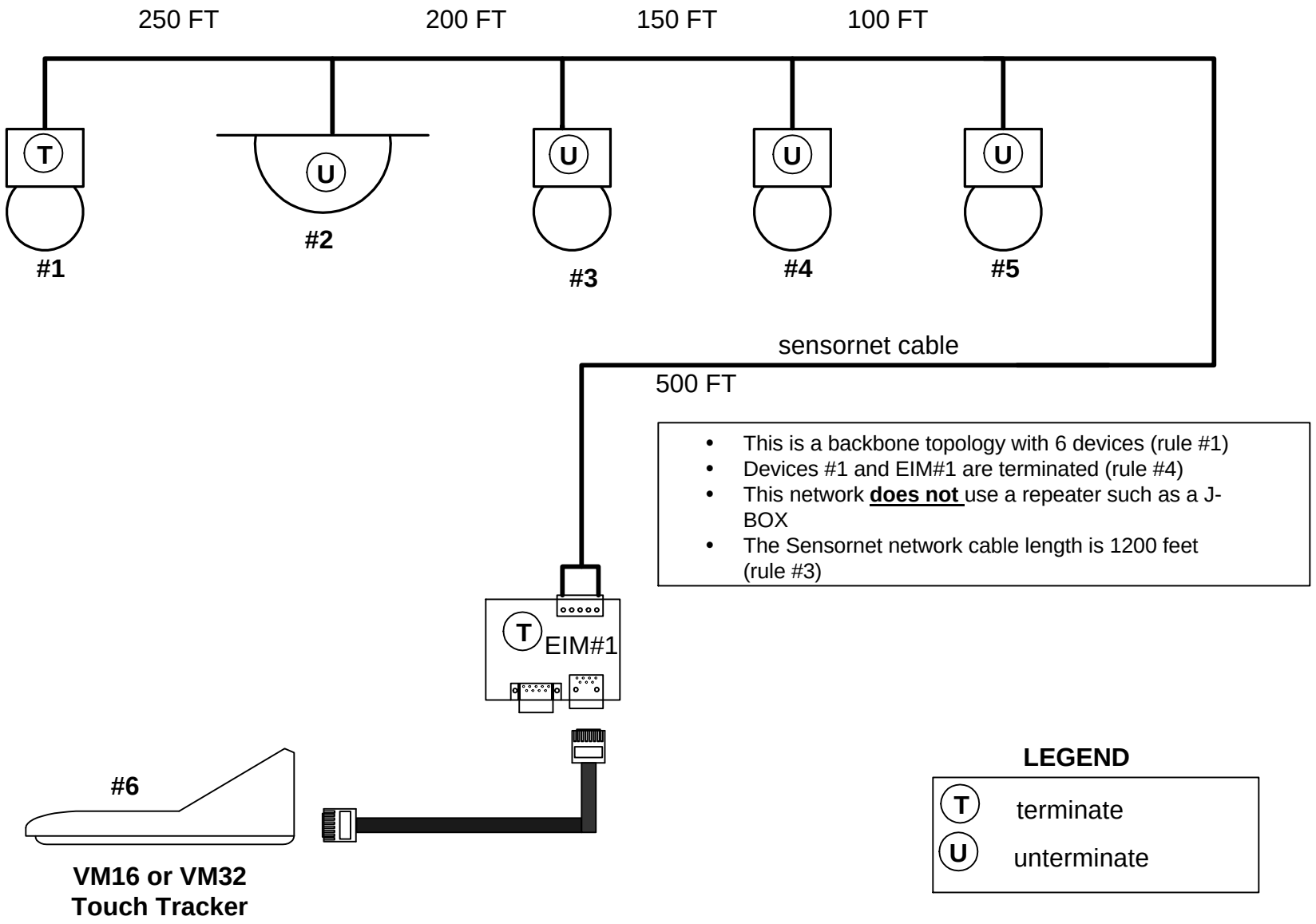
2: DEFINING DEVICES AND REPEATERS

DEVICES	REPEATERS
SpeedDome	Sensornet J-Boxes
SpeedDome Ultra	VM96
SpeedDome Optima	AD48, and AD168
VM96 Sensornet I/O module	Sensornet Fiber Module
Touch Trackers (VM16, VM32, and VM96)	
Sensornet to RS-422 code converter	

Definition: A DEVICE is any unit that is attached to a Sensornet network. A repeater is any device that will amplify the signal as it passes through.

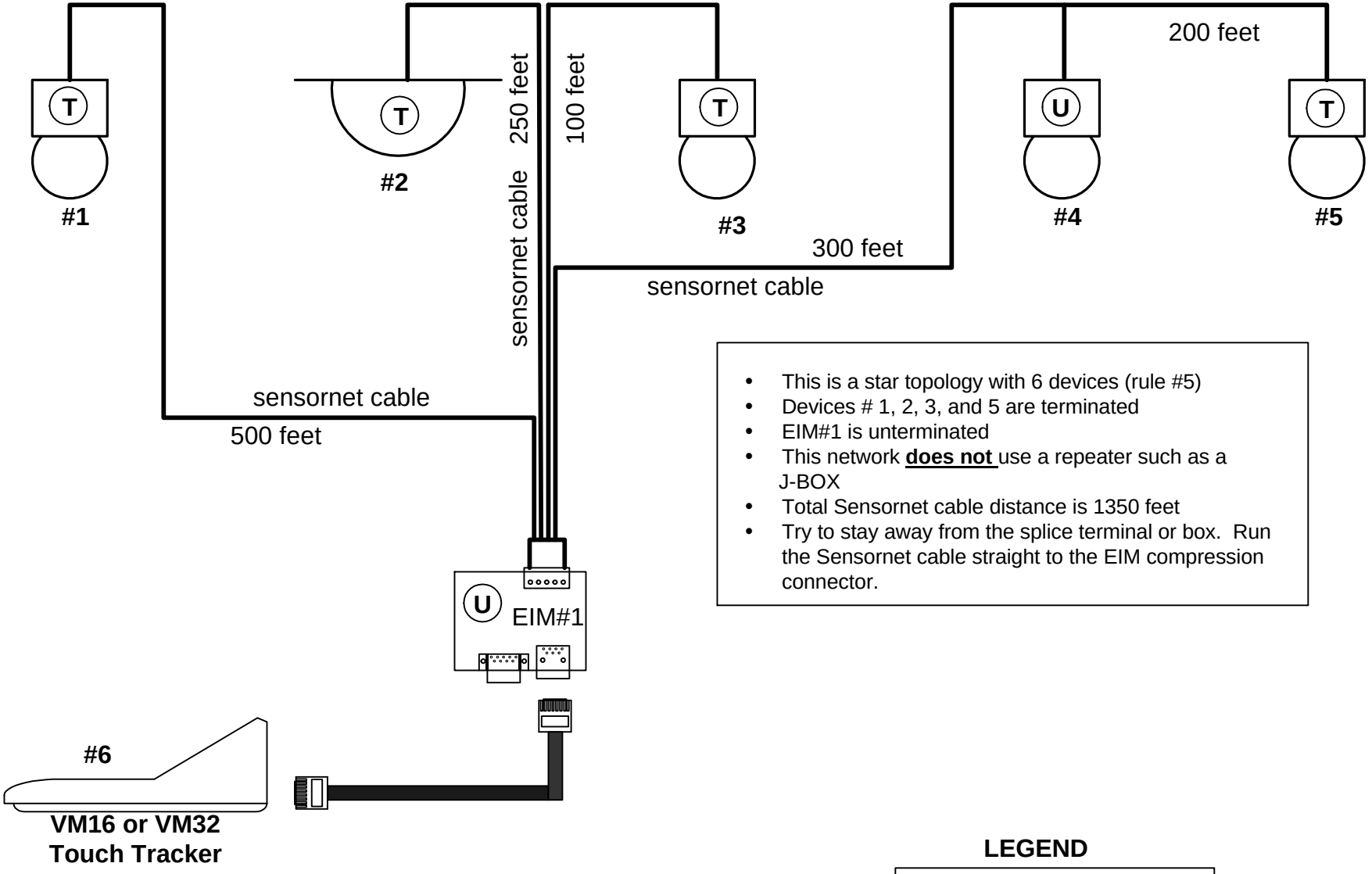
3. SAMPLE CONFIGURATIONS

STANDALONE VM16 AND VM32 (BACKBONE TOPOLOGY)



- This is a backbone topology with 6 devices (rule #1)
- Devices #1 and EIM#1 are terminated (rule #4)
- This network **does not** use a repeater such as a J-BOX
- The Sensornet network cable length is 1200 feet (rule #3)

STANDALONE VM16 and VM32 (STAR TOPOLOGY)

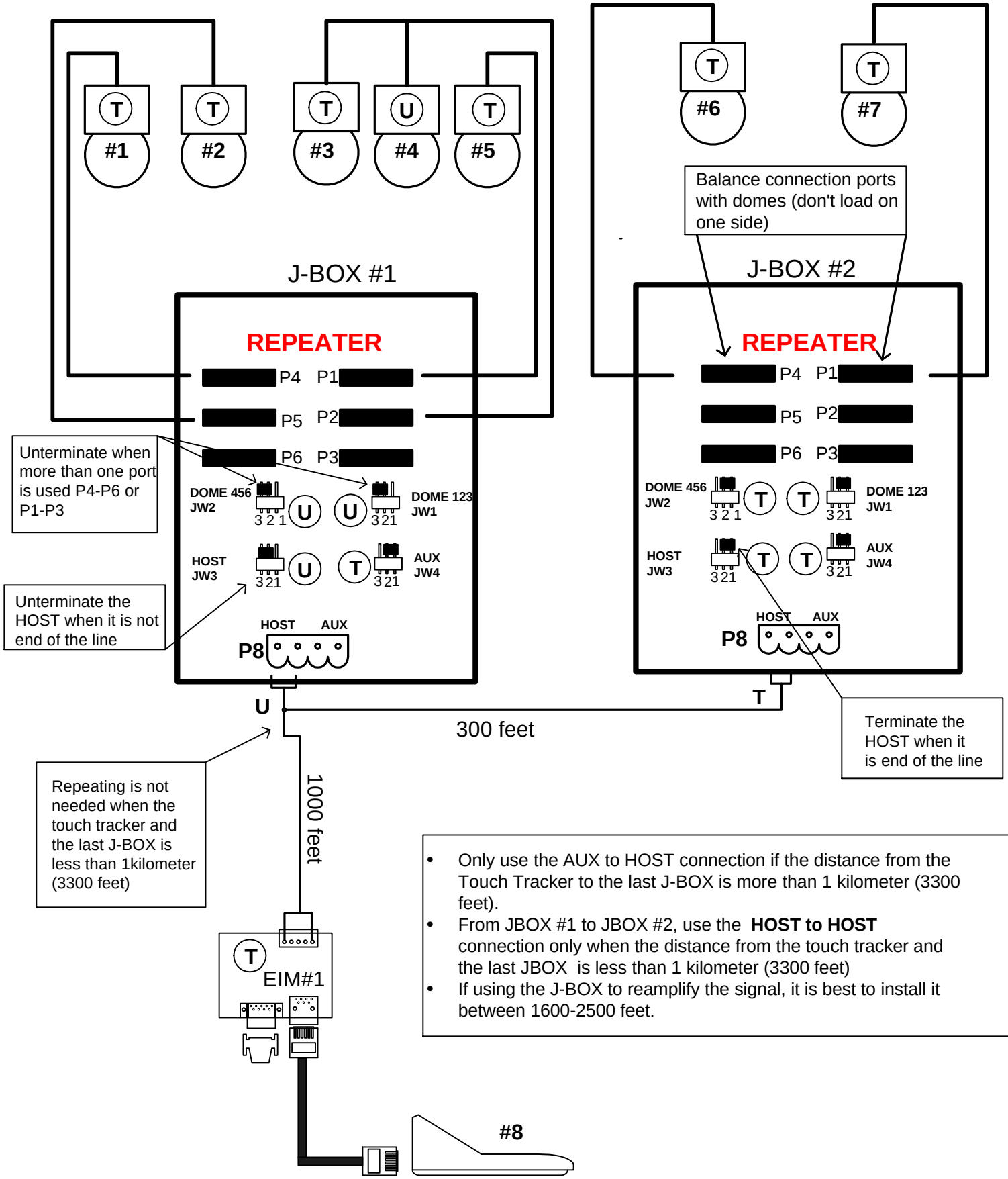


- This is a star topology with 6 devices (rule #5)
- Devices # 1, 2, 3, and 5 are terminated
- EIM#1 is unterminated
- This network **does not** use a repeater such as a J-BOX
- Total Sensornet cable distance is 1350 feet
- Try to stay away from the splice terminal or box. Run the Sensornet cable straight to the EIM compression connector.

LEGEND

T	terminate
U	unterminate

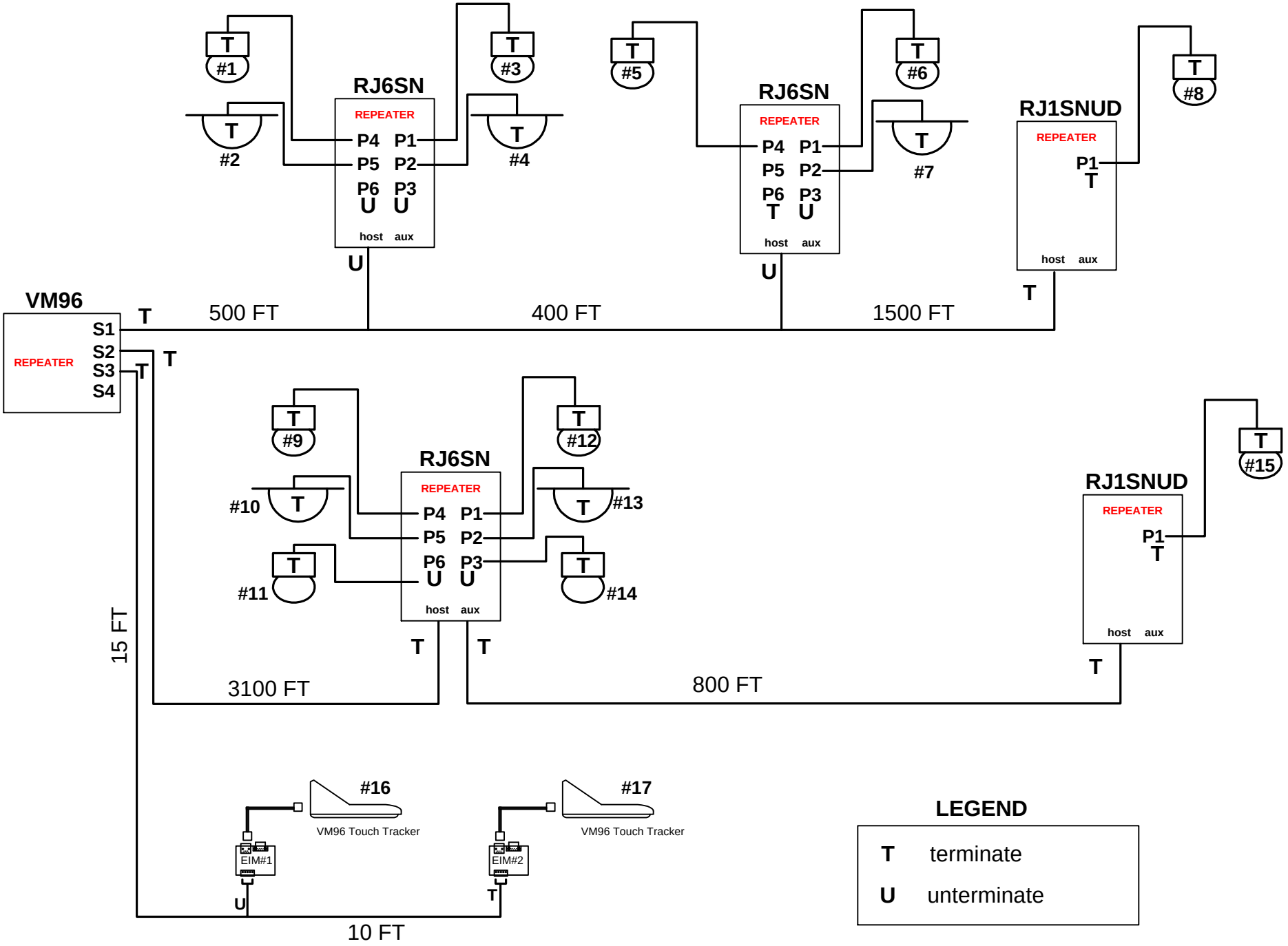
VM16 OR VM32 WITH J-BOXES



- Only use the AUX to HOST connection if the distance from the Touch Tracker to the last J-BOX is more than 1 kilometer (3300 feet).
- From JBOX #1 to JBOX #2, use the **HOST to HOST** connection only when the distance from the touch tracker and the last JBOX is less than 1 kilometer (3300 feet)
- If using the J-BOX to reamplify the signal, it is best to install it between 1600-2500 feet.

VM16 or VM32 Touch Tracker

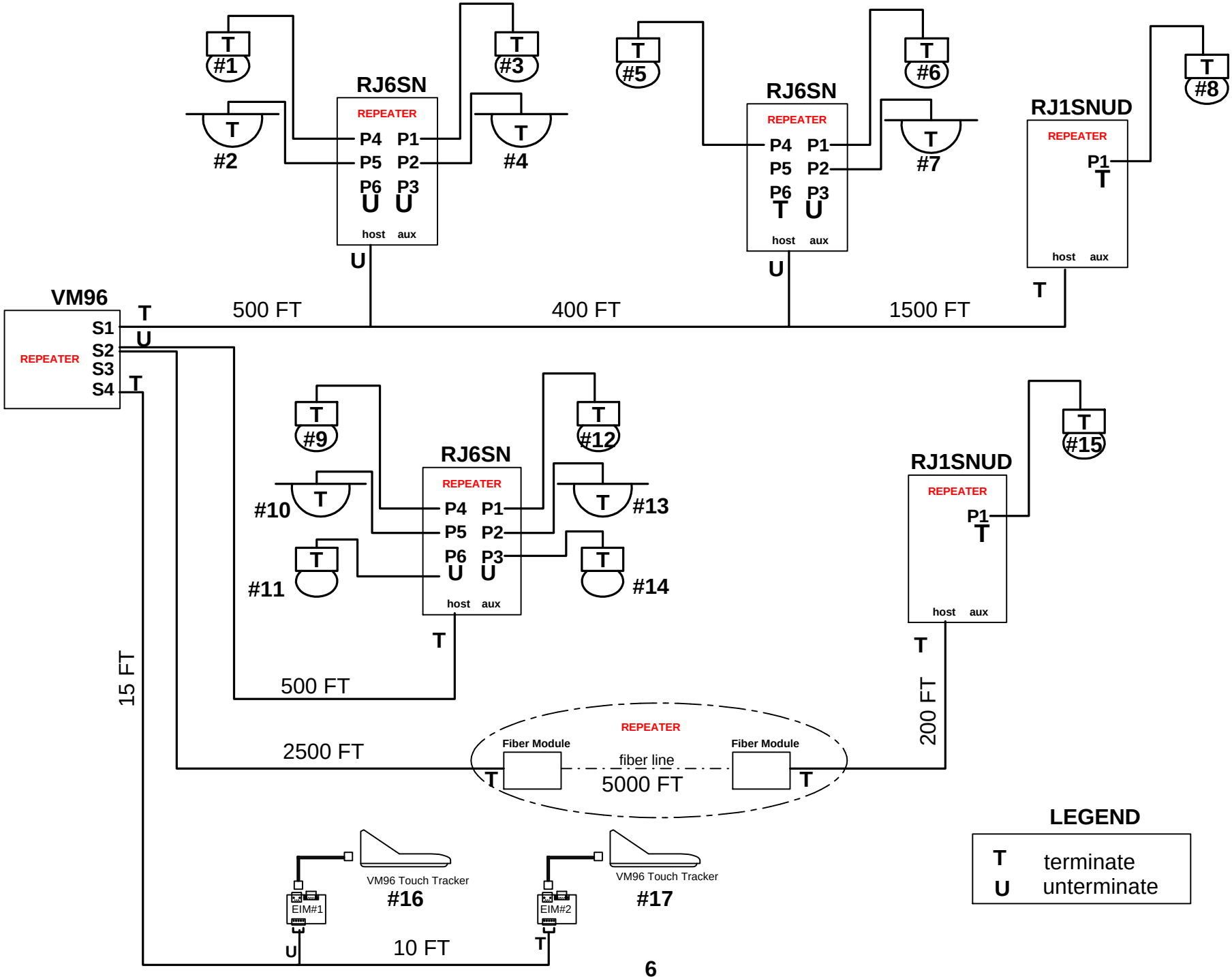
VM96 SENSORNET CONFIGURATION (SAMPLE #1)



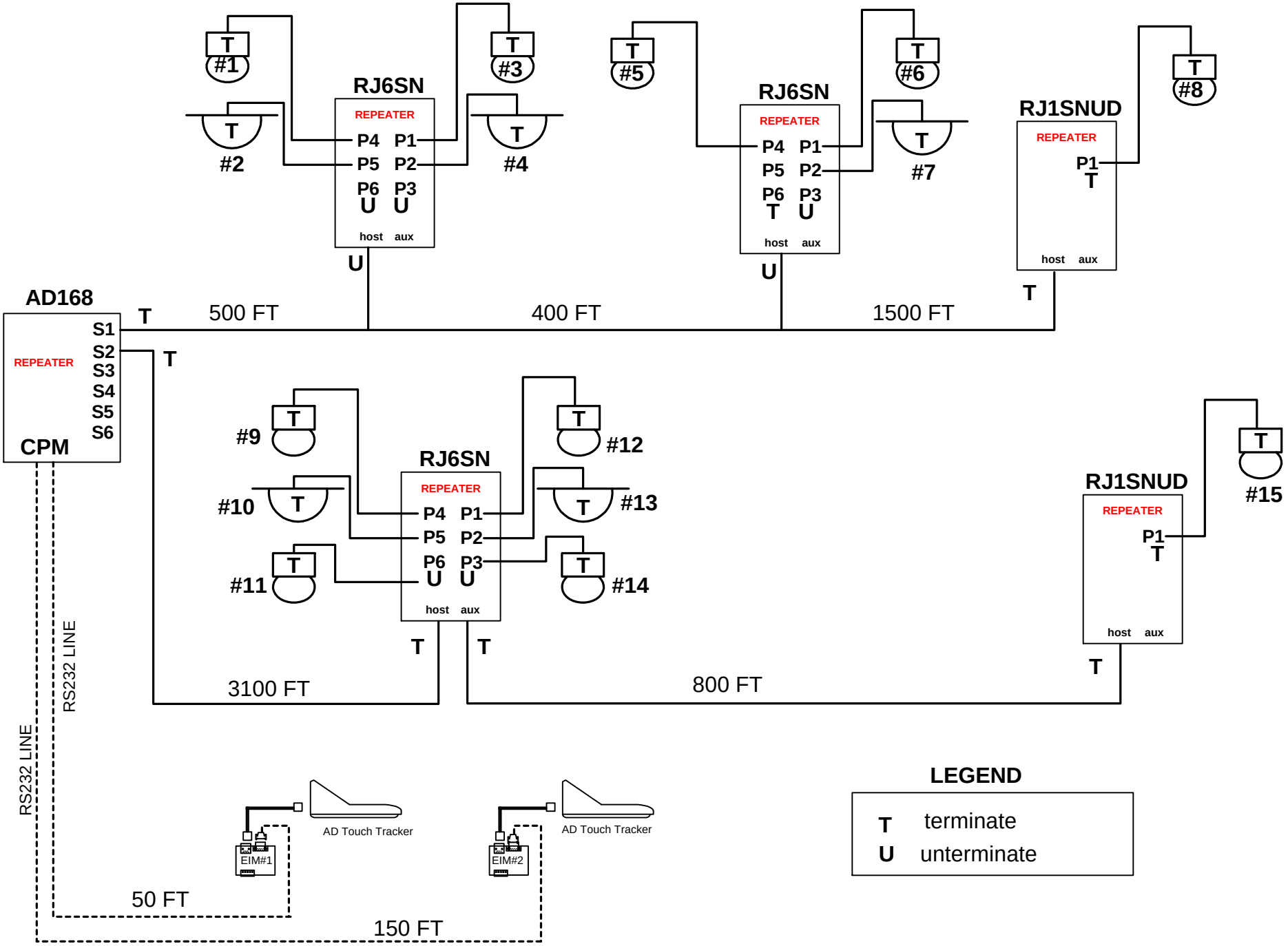
LEGEND

T	terminate
U	unterminate

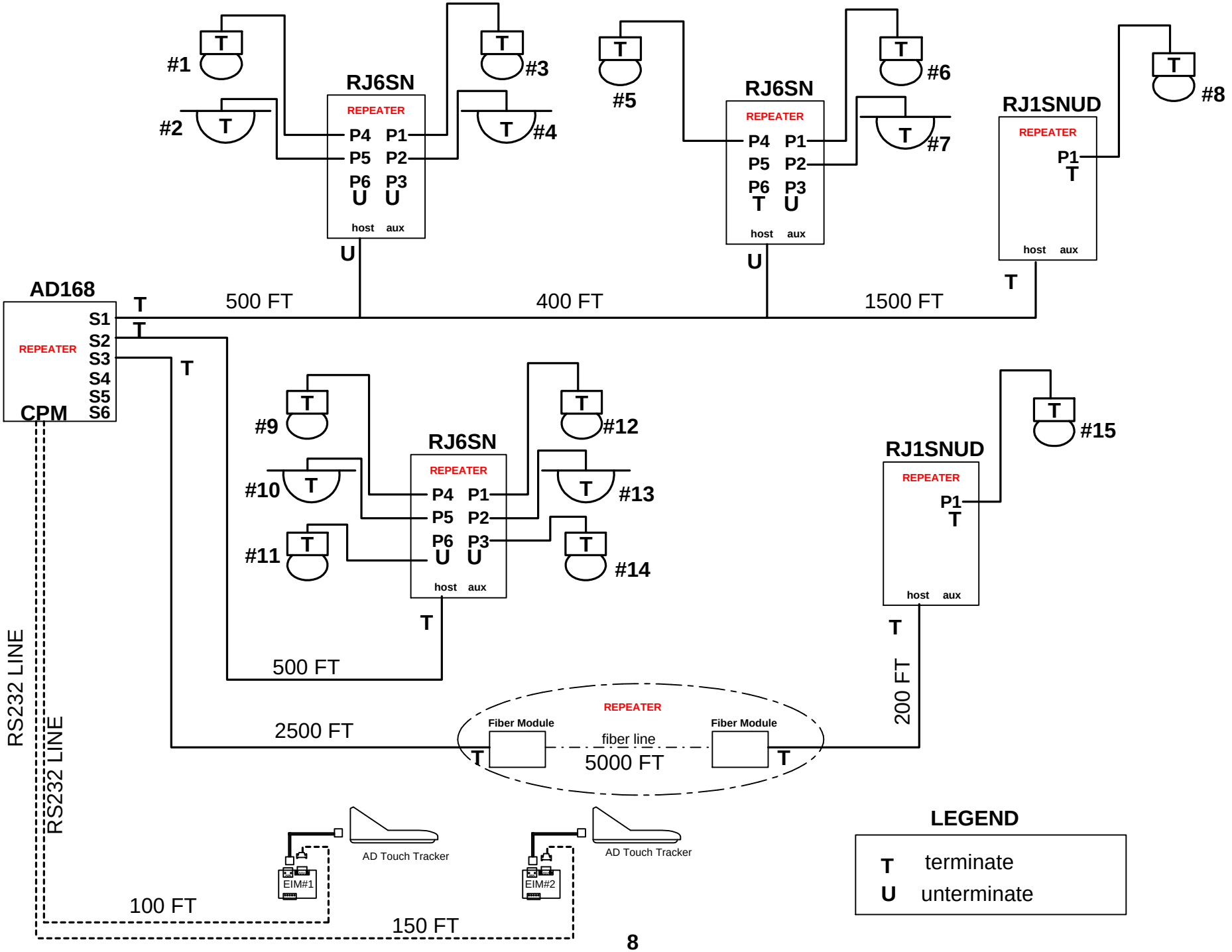
VM96 SENSORNET CONFIGURATION (SAMPLE #2)



AD168 SENSORNET CONFIGURATION (SAMPLE #1)



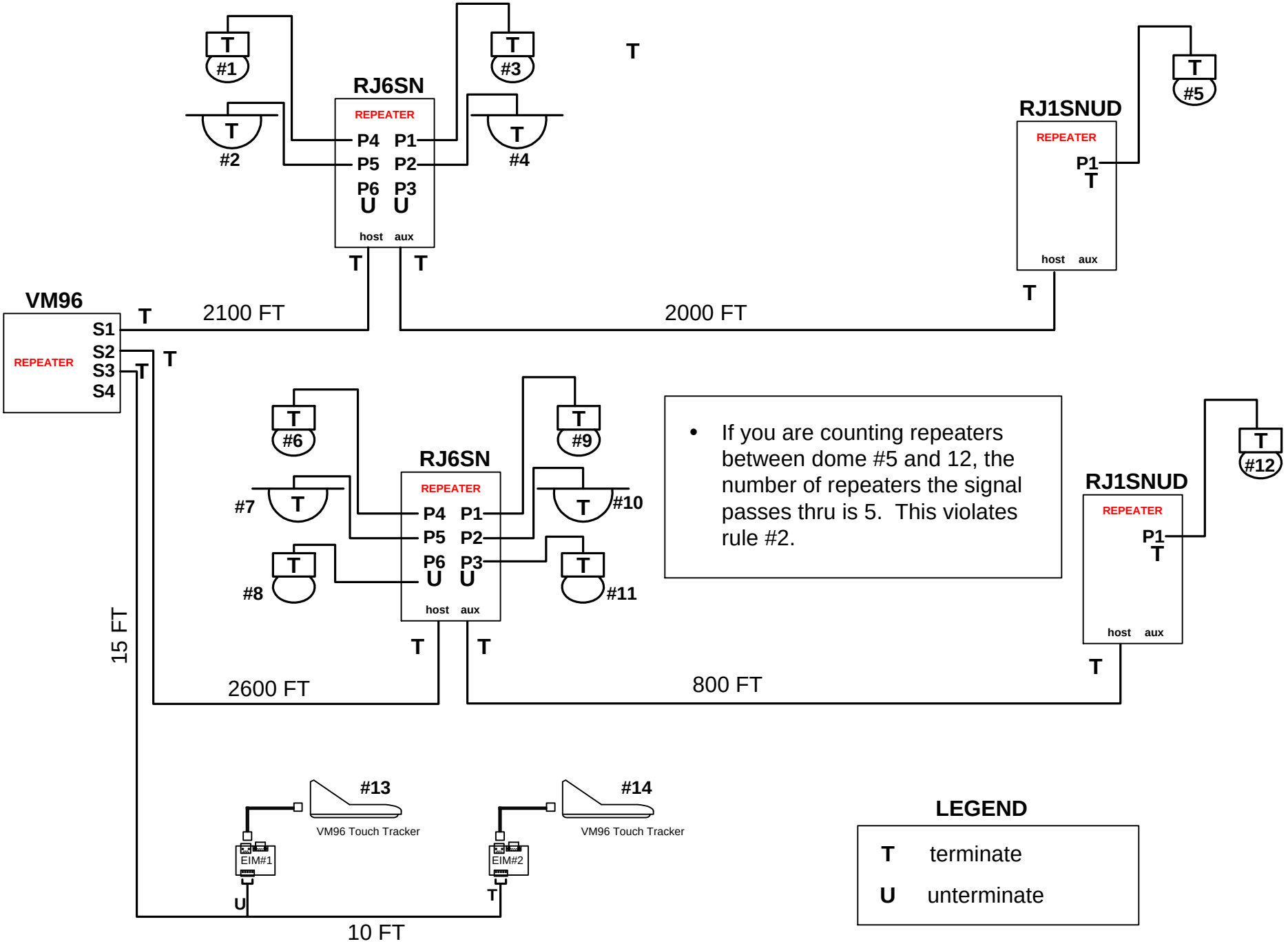
AD168 SENSORNET CONFIGURATION (SAMPLE #2)



LEGEND

T	terminate
U	unterminate

4. SAMPLE OF INVALID CONFIGURATION



- If you are counting repeaters between dome #5 and 12, the number of repeaters the signal passes thru is 5. This violates rule #2.

LEGEND

T	terminate
U	unterminate

4: CABLE SPECIFICATIONS

SENSORNET NON-PLENUM	SENSORNET PLENUM
Mechanical:	**Mechanical:**
Inner Conductors: …22AWG (7 x 30) Stranded Tinned Copper.	Inner Conductors: ..... 22AWG (7 x 30) Stranded Tinned Copper.
Inner Conductor Insulation: Plenum Rated PVC, OD .044" REF.	Inner Conductor Insulation: FEP Teflon, Halar, or Plenum Rated PVC, OD .044" REF.
Lay: ..... Two insulated conductors twisted together with a 1.5" nominal lay length.	Color Code: ..... Pair #1 = Orange and Yellow
Color Code: ..... Pair #1 = Orange and Yellow	Lay: ..... Two insulated conductors twisted together with a 1.5" nominal lay length.
Protective Wrap: ..... Polyester wrap, Optional; (no aluminum/polyester shield permitted).	Protective Wrap: ..... Polyester wrap, Optional; (no aluminum/polyester shield permitted).
Outer Jacket: ..... PVC, OD .130" REF.	Outer Jacket: ..... Plenum Rated PVC, OD .118" REF.
Electrical:	**Electrical:**
Voltage Rating: ..... 300 Volts Minimum	Voltage Rating: ..... 300 Volts Minimum
Capacitance: ..... 30 pf/ft	Capacitance: ..... 30 pf/ft
Attenuation @ 230KHz = 4dB/1000 feet maximum	Attenuation @ 230KHz = 4dB/1000 feet maximum
Environmental:	**Environmental:**
Operating Temperature Range: -20°C to +60°C Min	Operating Temperature Range: -20°C to +60°C Min
	Operating Humidity: ..... 95% RHNC
Regulatory Requirements:	**Regulatory Requirements:**
UL Listed, CSA Certified, and NEC Compliant.	UL Listed, CSA Certified, and NEC Compliant.
NEC Classification Requirements: CM Minimum.	NEC Classification Requirements: CMP Minimum.