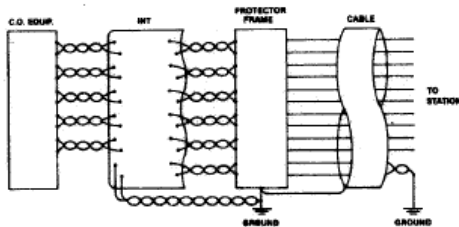


How to connect the HUMZAPPER

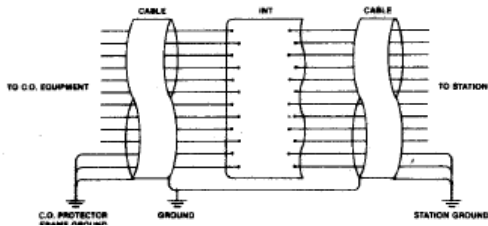
INT

An Induction Neutralizing Transformer is a multipair longitudinal inductor specifically designed to be inserted in series with a telecom cable to reduce induced longitudinal low frequency steady-state or transient voltage and currents.



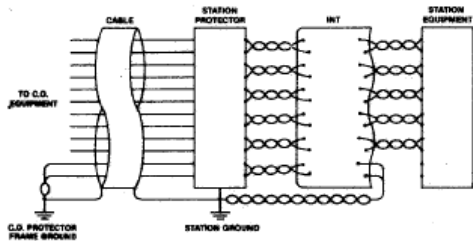
Central Office (Trunks or Exchange Lines)

Notes: 1, 2, 3, 8



Outside (Plant) Cable

Notes: 2, 3, 4, 5, 6, 8

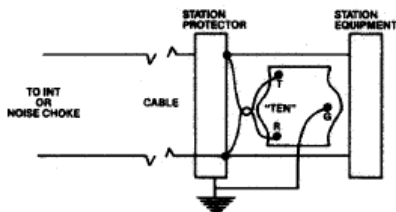


Station Equipment

Notes: 2, 3, 4, 7, 8

TEN

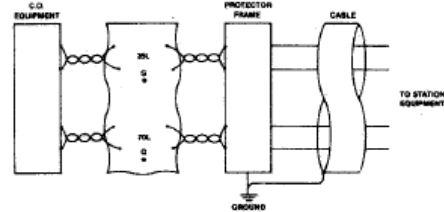
The Transformer Exciting Network is a mutual drainage reactor especially designed to have a low impedance-to-ground at 50/60 Hz. Used primarily with an INT or Noise Choke, the TEN may be used by itself to help drain the electrostatic voltages from non-shielded facilities.



Notes: 4, 7, 8, 9, 10, 11

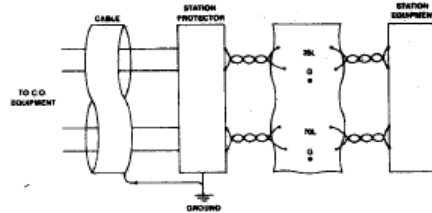
NOISE CHOKES

Well balanced high impedance, two winding transformers specifically designed to be inserted in series with a telecom cable to reduce steady-state or transient-induced longitudinal harmonic currents.



Central Office (Trunks or Exchange Lines)

Notes: 8, 10, 12, 13, 14, 15, 16

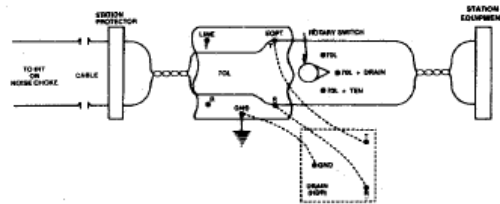


Station Equipment

Notes: 7, 8, 10, 12, 13, 14, 15, 16

HDR

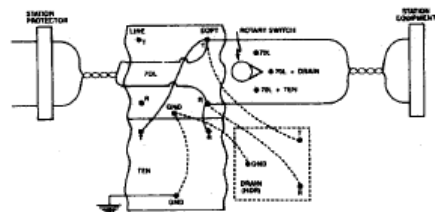
The Harmonic Drainage Reactor is a mutual drainage reactor designed to provide a relatively low impedance path-to-ground for a broad voice frequency spectrum especially the harmonics of 50/60 Hz. (How to achieve an HDR in a HumZapper is shown below.)



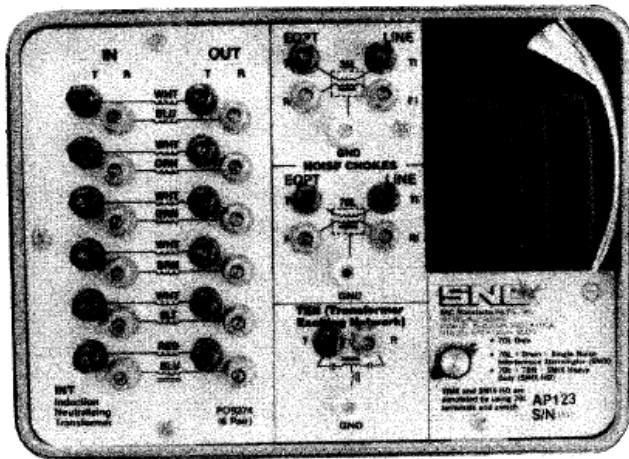
Notes: 4, 7, 9, 10, 11, 17

SUPER TEN

A TEN packaged with an HDR constitutes a "Super TEN." This combination benefits from the low frequency (50/60 Hz) performance of the TEN and the harmonic performance of the HDR. (How to achieve a Super TEN in a HumZapper is shown below.)

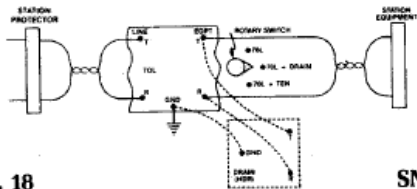


Notes: 4, 7, 9, 10, 11



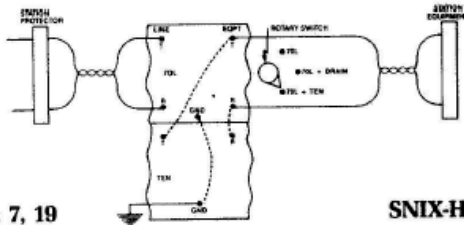
SNIX, SNIX-HD, SUPER SNIX

The Single Noise Interference XTerminators are a combination of a longitudinal inductor and a mutual drainage reactor. They are designed to provide single circuit mitigation of longitudinal AC interference. The basic SNIX uses an HDR for the drainage reactor portion. The SNIX-HD (heavy duty) uses a TEN while the Super SNIX uses an HDR and a TEN in parallel. The longitudinal inductor is basically the same in each. (How to achieve each of these units in a HumZapper is shown below.)



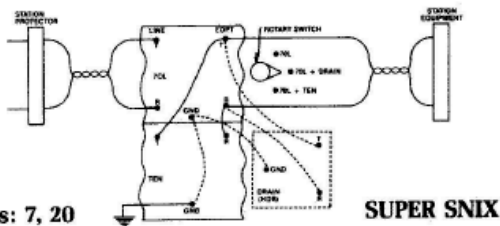
Notes: 7, 18

SNIX,



Notes: 7, 19

SNIX-HD,



Notes: 7, 20

SUPER SNIX

NOTES:

- Although illustration shows a grounded exciting pair, it may not be needed since a C.O. located INT often self-excites.
- Caution: Use of Noise Choke or INT on only a few pairs within a cable may not achieve the best results. Unless all pairs in a given exposure are treated, secondary induction may recouple the interference back into the treated pairs.
- All types of carrier systems can be used with standard INT's but lower loss and cross-talk coupling considerations may justify the digital type, for digital carrier systems.

- Exciting pair required either grounded or with TEN. HDR or both on working line.
- With a single power line exposure the AC voltage across the transformer should approx. equal the total of the voltage-to-ground measured on both sides of the INT.
- Proper location may be critical to achieve maximum noise reduction.
- When the INT or a Noise Choke in combination with a TEN, HDR or both is effective, the SNC Telecommunication Interference Filter (TIF) or SNIXes may be used.
- A TEN connected to the far end of an INT or Noise Choke equipped "working" line and properly grounded will provide the path-to-ground for longitudinal AC exciting current to flow. Its use eliminates the need for a dedicated exciting pair through an INT.
- A TEN packaged with an HDR constitutes a "Super TEN." This combination benefits from the low frequency (50/60 Hz) performance of the TEN and the harmonic performance of the HDR. To achieve this "Super TEN" in a HumZapper, bridge the T and R of the TEN to the EQPT (T & R) jacks of the 70L Noise Choke. Turn the rotary switch to "70L + Drain" and connect the "G" terminal of the TEN to a good ground. ("G" terminals are all common.) Bridge combined EQPT T and R of the units to the circuits as desired.
- Noise Chokes are most effective when placed at the Central Office end of a circuit, wherever a low impedance path-to-ground is provided or with a TEN, HDR or Super TEN at the far end of the exposed cable route.
- The TEN, HDR or Super Drain may be used as "stand alone" units to drain AC currents or voltages off of one circuit. However, current should be limited to 240 mils through a TEN or Super TEN and 100 mils through an HDR. An INT in the circuit would limit this current to a safe value as would a Noise Choke if the rated voltage value of the Choke is not exceeded.
- Voltage across the Noise Choke should not exceed 50VAC with the 70L or 30VAC with the 35L.
- Selection of a 70 vs 35 Noise Choke is based on anticipated maximum steady-state voltages and possible loop resistance limitations. 35 volt units add 85 ohms and the 70 volt units add 45 ohms to the loop.
- Ground (G) terminal is connected to copper flux band of Noise Choke for Radio Frequency Interference (RFI) suppression (Equivalent to SNC's Radio Interference Dampener (RID)).
- Noise Chokes used on party lines may cause cross rings.
- Noise Chokes are for use on voice frequency circuits only.
- SNC's HDR is simulated by using the 70L Noise Choke "EQPT" and "GND" terminals (Line terminals left open) with the rotary switch positioned to 70L + Drain.
- The SNIX is simulated by using the terminals of the 70L Noise Choke for the "Line," "EQPT" and "GND" of the SNIX. The HDR drain portion is bridged across the "EQPT" terminals by positioning the rotary selector switch to 70L + Drain.
- The SNIX-HD is simulated by using the terminals of the 70L Noise Choke for the "Line," "EQPT" and "GND" of the SNIX-HD. The TEN portion is bridged across the "EQPT" terminals by positioning the rotary selector switch to 70L + TEN.
- The Super SNIX is simulated by using the terminals of the 70L Noise Choke for the "Line," "EQPT" and "GND" of the Super SNIX. The HDR portion of the unit is bridged across the "EQPT" terminals by positioning the rotary selector switch to 70L + Drain. The TEN portion is added by physically bridging the T and R terminals of the TEN to the "EQPT" T and R terminals of the 70L. This may be done with a two conductor AP136 or similar patch cord.

REFER TO SNC TELECOM PROBLEM SOLVERS CHART, APPLICATION NOTES, BULLETINS, AND PRACTICES FOR MORE INFORMATION.

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