??? NEED HELP ???

APPLYING FOR YOUR QUALIFIER TRANSMITTER LICENSE

We have included on the Feature Installation Software CD a folder full of instructions, application templates in Microsoft Word and Acrobat formats along with helpful web sites to get you up and running in no time. Please browse to and open the file named *Customer Packet*. Read the Adobe Acrobat document *Read Me First*.

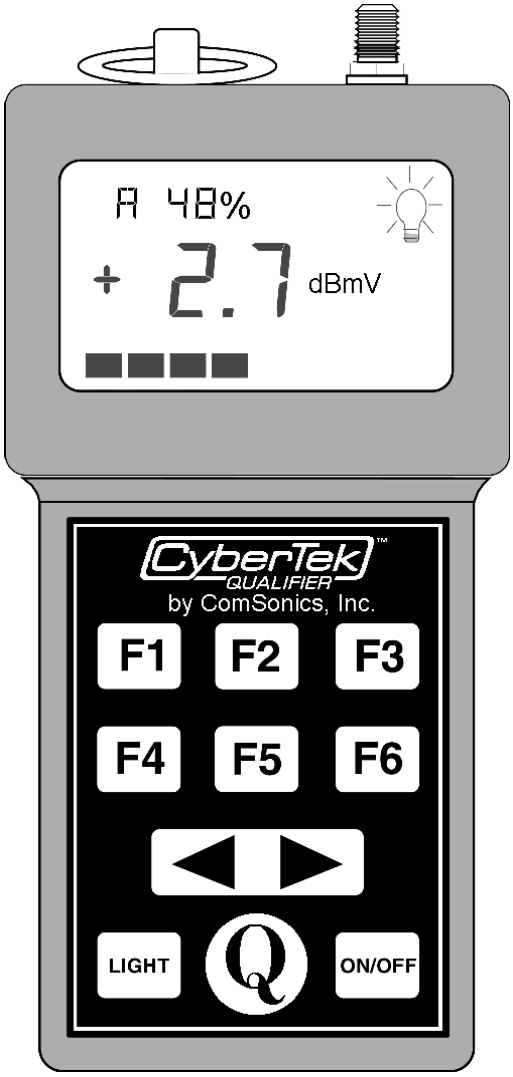
If you encounter difficulty, please give our Customer Service Representatives a call. They will be glad to help.

1-800-336-9681

CyberTek™ QUALIFIER

HOME QUALIFICATION SYSTEM

User Guide



Signal Level Meter
with
Digital Level Capability
and
Home Qualification Features

ComSonics, Inc. An Employee Owned Corporation

CSI Document 101268-001 Rev. C unreleased

Warranty

ComSonics, Inc. warrants this product to be free of material and workmanship defects for a period of one year from the original date of shipment.

Remedies provided under Warranty are exclusive and in lieu of all other warranties express or implied. The liability to ComSonics is limited to product repair or replacement at the discretion of ComSonics. ComSonics shall not be held liable for any incidental or consequential damages.

The following are not covered by this warranty:

1) Parts or components not supplied by ComSonics, or parts or components that have been modified.
2) Any product or part failure that results from accident, abuse, misuse, neglect, or unauthorized repairs or modifications by individuals other than ComSonics personnel.
3) Failures caused by use of this product in extreme climates or moisture conditions.
4) CyberTek Qualifier Battery Pack

Technical Support

ComSonics maintains a Technical Support Service for customer convenience. Should the need arise, contact a Technical Support Representative by telephone at 1-800-336-9681 or 1-540-434-5965; Fax at 1-540-432-9794; or Email at tech-support@comsonics.com.

Return Information

Products returned for repair, calibration, etc. must be safely packed. Please enclose information on the reason for return. Ship the material prepaid.

ComSonics, Inc.
1350 Port Republic Road
Post Office Box 1106
Harrisonburg, Virginia 22801 USA
Phone: (540) 434-5965 USA Toll Free: (800) 336-9681
Fax: (540) 434-9847
Email: marketing@comsonics.com
Internet: www.comsonics.com

Agency Notice

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC ID: PYN12002A vehicle mounted device
FCC ID: PYN22002B hand held device

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

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Document No. 101268-001 Rev. C unreleased

Table of Contents - Signal Level Meter and Home Qualification System

FCC License Requirement

A FCC license is required to operate the CyberTek Home Qualification System, specifically the transmitter component. Contact your ComSonics representative for assistance in this matter.

CAUTION !

The Cybertek Home Qualifier System must be installed in a service vehicle equipped with a 12-volt negative ground electrical system.

Note:

The battery charger for the Qualifier Signal Level Meter is designed to be used only with 120VAC power from a wall outlet. Use of other power sources, such as a vehicle inverter, may reduce the usability of the meter.

Specifications - Qualifier System

Qualifier Signal Level Meter - General Specifications

Tuning range	5.00 MHz ~ 860.00 MHz
Amplitude range	-30 dBmV (+30 dBmV) ~ +40 dBmV (99.9 dBmV)
Amplitude accuracy	±1.0 dB at room temperature; ±1.5 dB over operating temperature
Analog Television Types	NTSC / PAL; peak carrier sync, preprogrammed audio offset
Digital Modulation Types	QPSK, QPR, QAM, and VSB; bandwidth up to 20 MHz
Tuning increments	Fixed (tuned by pre-loaded tables)
Tuning accuracy	Auto-seeking to ≤ 62.5 kHz
Auto-seeking range	±312 kHz
(Direct access) quick-tuned channels	6 channels - user-configurable (factory pre-sets per Country Set)
Step-tuned channels	Pre-loaded channel set dependent
Pre-loaded channel sets	25 standard, picture carrier plus associated sound carrier
Audio Output	Frequency modulation detector produces low impedance output to earphone jack (earphone optional)

Qualifier Mode

Frequency	27.450, 27.470, or 27.490 MHz
Activation Distance	Up to 150 feet between receiver and transmitter

Power

Battery	User rechargeable, 6.0 V @ 0.55 Ah
Battery recharge life	> 550 measurements*

Size / Weight

Size	7.7” high X 3.5” wide X 2.3” deep (19.6 cm X 8.9 cm X 5.8 cm)
Weight	23 oz. (0.65 kg)

Environment

Storage temperature range	-20 °F ~ 150 °F (-29 °C ~ 66 °C)
Operating temperature range	0 °F ~ 120°F (-18 °C ~ 49 °C)
Humidity	Weather resistant (withstands total immersion into 1 foot of water for 30 minutes without intrusion)
Shock	Uniquely rugged

Qualifier Transmitter - General Specifications

RF Output Power	5 watts
Frequency	Factory set to 27.450, 27.470, or 27.490 MHz
Input Supply Voltage	Vehicle power - 12 volts DC negative ground
Size	7.7” x 4.4” x 1.7” less connectors and mounting bracket
Weight	2.5 lb
Storage Temperature	-20°F ~ 150°F
Operating Temperature	0°F ~ 120°F
Humidity	5% ~ 95% (non condensing)

**Beginning with a new, fully charged battery. Room temperature lab tests produced more than 1,100 measurements by repeatedly activating F1through F6 at 10 second intervals until automatic shut-down occurred.*

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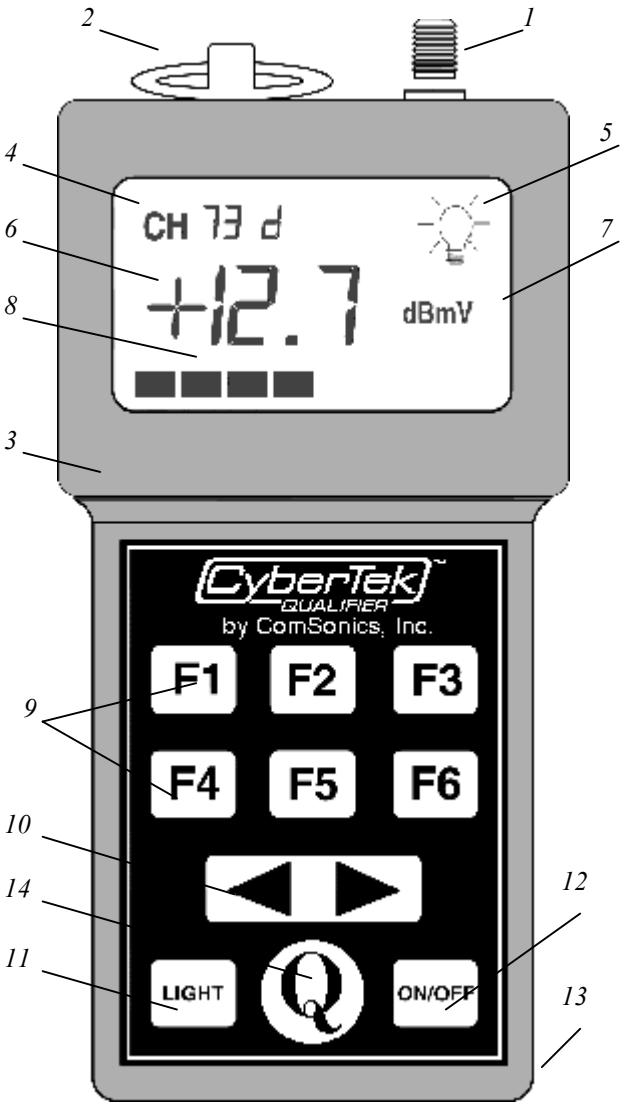
Description

The ComSonics CyberTek Qualifier is a signal level meter dedicated to the CATV installer. It features the ability to easily choose for evaluation any one of six pre-selected channels from the full tuning range available. The Qualifier meter makes measurements on the chosen channel with a single keystroke, showing the results on a backlight-capable liquid crystal display (LCD).

The Qualifier meter's controls have been simplified to make its operation as easy as possible. The keypad has six function keys (F1 through F6), each capable of tuning a picture carrier frequency and its sound carrier frequency or a single digital channel in the 5 MHz to 860 MHz range. It also has arrow keys for single step tuning the unit within this range. There are keys to control the backlight feature as well as for powering the unit on and off. The LCD features the channel being measured, its level readout, and the unit of measure. A light bulb symbol appears when the backlight is in use; a battery symbol appears when the battery level is low. Unless the battery charge life is nearing an end, a bar graph shows the relative signal strength. When the battery symbol is present, the bar graph indicates remaining battery life.



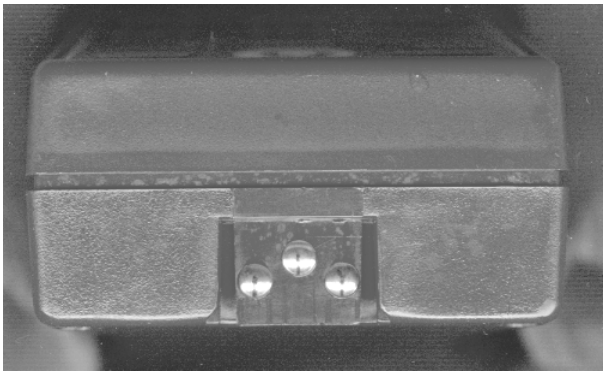
1 *Input*
2 *Lanyard Ring*
3 *ABS plastic housing*
4 *Tuned channel*
5 *Backlight indicator*
6 *Level indicator*
7 *Units of measure (dBmV or dBµV)*
8 *Level strength indicator*
9 *Function (channel) keys*
10 *Arrow selection keys*
11 *Backlight key*
12 *Power ON / OFF key*
13 *Earphone jack*
14 *Qualifer Mode key*

Battery Care

The Qualifier meter uses a rechargeable battery. For recharging this battery, ComSonics includes a single-unit battery charger as a standard accessory.

The single-unit charger's contact end (see illustration) consists of a yellow plastic housing, with flanges on either side, and two spring-loaded prongs. It fits into the slot on the bottom edge of the Qualifier meter, which has contacts corresponding to the charger prongs (see illustration).

Prongs of a single-unit charger



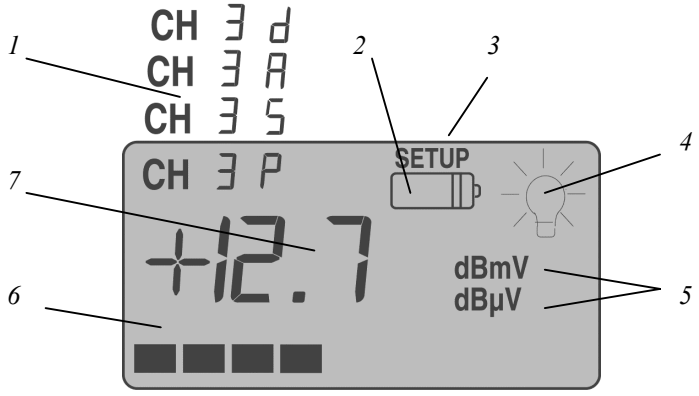
Contact end of Qualifier metert and points

To engage the contacts properly, hold the Qualifier meter face up, place the charger connector so the flanges fit into the corresponding grooves in the Qualifier meter's contact end, and push towards the front of the Qualifier meter. When the charger connector is completely inserted, the prongs will be in contact with the Qualifier meter's contact points. Plug in the charger pack to begin recharging your Qualifier meter. Fully recharging a depleted battery takes approximately 10 to 16 hours.

When the battery charge drops below a set level, the battery low indicator (▭) appears. The bar graph of the display blinks while this indicator is present, and shows the relative amount of charge remaining.

Power-Up

When first powered-on, Qualifier meter is in a low power state to reduce battery consumption. In this state, the LCD provides the user with the channel name, units of measure, the last measured value and a bar graph. “Backlight” and/or “Battery Low” annunciators may also appear.



1 The **selected channel name** in the format [CH XX88 X]. CH for channel, followed by the channel name comprised of a combination of two alpha-numeric and two numeric characters. The channel name is followed by P for picture carrier, or S sound carrier, or A for channels with a second audio channel, or d for a programmed digital channel. Digital channels are user programmed via a computer program. See section *Feature Installation Utility*.

2 **Battery symbol** is illuminated if a battery low condition is sensed.

3 **SETUP** is illuminated when the User Preference mode is activated.

4 **Lightbulb symbol** is illuminated if the backlight is active.

5 **dBmV** or **dBµV** Units of Measure conforming to internationally used conventions.

6 The **bar graph** provides a visualization of the measured signal level relative to the total dynamic range.

-OR-

The **bar graph** provides a relative indication of the remaining battery life while the battery low signal is activated.

7 At Power-Up, the **measured value** displays the level of the last channel measured prior to power-down. The display updates with each function keypress.

User Preferences

Three built-in features are available for the user to customize the Qualifier meter: the Country Set, the Unit of Measurement and the selection of six Quick-Tune Measurement Channels.

One custom user channel line-up set or group can be created and installed to the Qualifier meter using the Feature Installation Utility. The utility is a PC Windows program necessary for the customization and installation of a user defined channel set. Digital channel definitions can only be installed by use of the utility. See section *Feature Installation Utility* for more details.

User Preferences are made available sequentially to the user through the SETUP mode. In each sequence, the display blinks, showing current settings. Any displayed setting can be changed with the arrow keys or left alone; changes are saved automatically.

To enter the SETUP mode, press and hold **F6** while powering the unit ON using the **ON/OFF** key.

Automatically, the Qualifier meter activates the **Country Set Define** sequence. The currently selected Country Set code number blinks. Arrow keys step through the sets available (see Appendix B for a complete listing). Pressing **F1** leaves this sequence and initiates the **Units of Measure Define** sequence.

The **Units of Measure Define** sequence of the SETUP mode is indicated by a blinking **Units of Measure** selection. Pressing either the right or left arrow key toggles between dBmV and dBµV. Pressing **F2** ends this sequence and activates the **Quick-Tune Channels Define** sequence.

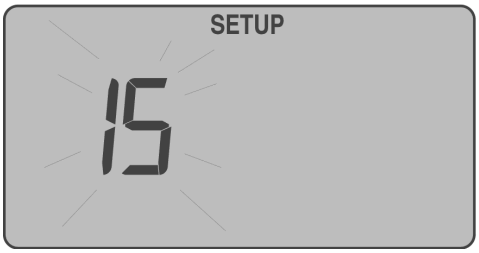
The **Quick-Tune Channels Define** sequence is the final stage of the setup mode. **F1** through **F6** can refer to any six picture/sound carrier pairs contained within the selected Country Set. At the beginning of the sequence, the channel display blinks, showing the setting for **F1**. Press any of the six function keys, and the unit displays the current video carrier channel setting. (If the unit has never been programmed, or if a new Country Set has been selected in the SETUP mode, the factory preset channel for that function key is displayed.) Use the arrow keys to change the channel setting if desired. This can be done for each function key, in any order, and more than once if desired.

End the SETUP mode by pressing **ON/OFF**; this saves the setup and shuts the unit off.

Country Set Define

From a preprogrammed list of countries, the user selects the one best suited to their area by: **(a)** placing the Qualifier meter into SETUP mode; **(b)** keying to the desired Country Set.

- Country sets are displayed (1 to 25).
- See the Appendix section for a listing of the available countries and their access codes.



Changing the Country Set automatically changes the channel settings to a default set of channels for that country set.

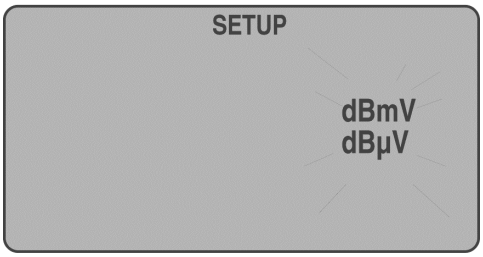
During this sequence, the Channel Name, Units of Measure, and the Bar Graph are suppressed from the display.

STEP	KEYPRESS	RESULTS
1.	F6 + ON/OFF	Power-on the Qualifier meter in SETUP mode; this activates Country Set Define sequence. The current Country Set code blinks, indicating that this code can be changed.
2.	◀ ▶	Scroll through the available country sets: ▸ scrolls forward (1 to 25, with the standard configuration), rolling over to the first set when the last set is passed. ◂ scrolls backward, rolling over to the last set when the first set is passed. **Note:** If a user channel set is installed, the country set range is 0 to 25. Set 0 is the user channel set. See section *Feature Installation Utility* for more details. **Important:** To reinitialize a country set, scroll forward by at least one number and then scroll back to the desired country set. The Quick-Tune keys and the channel center frequencies (learned) are reset to default whenever the county set is changed.
3.	F1	The device continues to the next sequence in the SETUP mode, **Units of Measure Define**, described on the next page.
	F2 ~ F6	Keys remain inactive during **Country Set Define**.

*Going straight to Step 3 below without touching ◂ ▸ leaves current **Country Set Define** setting unchanged and continues to the next sequence in the SETUP mode, **Units of Measure Define**.*

Units of Measure Define

The Qualifier meter makes available two Units of Measure to provide worldwide measurement compatibility. The user selects between dBmV and dBµV by: **(a)** placing the Qualifier meter into Units of Measure Define mode; **(b)** choosing between dBmV and dBµV; and **(c)** selecting Quick-Tune Channels Define.



During this sequence, the Channel Name, Measured Value, and the Bar Graph are suppressed from the display.

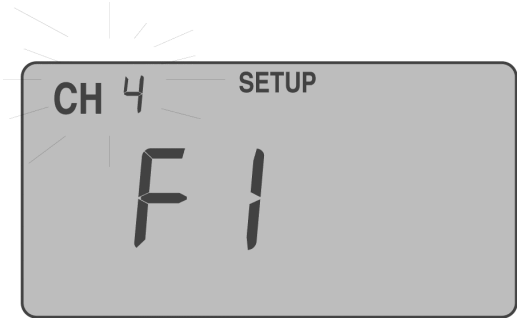
(continued from previous page)

STEP	KEYPRESS	RESULTS
		The **dBmV / dBµV** display blinks, indicating that this setting can be changed.
4.	◀ ▶	Toggles between dBmV and dBµV. ◀ or ▶ may be used.
5.	F2	The device continues to the next sequence in the SETUP mode, **Quick-Tune Channels Define**, described on the next page.
	F1, F3~F6	Keys remain inactive during **Units of Measure Define**.

*Going straight to Step 5 leaves current **Units of Measure Define** setting unchanged and continues to the next sequence in the SETUP mode, **Quick-Tune Channels Define**.*

Quick-Tune Channels Define

The Qualifier meter's function keys allow the user to easily tune to one of 6 preselected channels. Choices are selected for the key locations by: **(a)** placing the Qualifier meter into the SETUP mode; **(b)** stepping to the Quick-Tune Channels Define sequence; **(c)** selecting channel choices; and **(d)** changing the displayed setting (any change is automatically stored).



During this sequence, the Measured Value, Units of Measure, and the Bar Graph are suppressed from the display.

*If the unit has never been programmed (or if a new Country Set has been entered in the **Country Set Define** sequence), the channels displayed in this function will be channel defaults determined by the Country Set; otherwise the last channel values programmed for each key will be displayed.*

(continued from previous page)

STEP	KEYPRESS	RESULTS
		The Selected Channel setting blinks, displaying the video carrier setting stored under **F1**. NOTE: The display will blink if the channel has never been tuned before, or is changed here; if the channel has been previously tuned, it will *not* blink.
6.	◀ ▶	Change the channel setting: ▸ Increments setting from a low channel to a high channel; ◂ Increments setting from a high channel to a low channel. No additional keypresses are required to lock a setting. Pressing ◂ or ▸ changes and stores the setting simultaneously. If ◂ or ▸ are *not* used, the setting is *not* changed. Changes will be effective at the next power-up.
7.	F1 or F2 or F3 or F4 or F5 or F6	The display will react as above for the selected function key.
8.		Repeat Step 6 for as many function keys as desired.

If you wish to tune a channel at this time, press the function key indicated on the display to have the Qualifier meter search for a center frequency. If the center frequency is found, the F Key indicator ceases to blink. If the center frequency is not found, the F Key indicator will continue to blink. (In measurement mode, the center frequency search process takes place automatically when a channel is selected for the first time.)

9.	ON/OFF	Ends the SETUP mode and shuts off the unit.

Making Measurements

Each user request for a measurement causes the Qualifier meter to tune to the channel assigned to the function key pressed: the Qualifier meter displays the picture carrier, and another press of the same key toggles to the sound carrier, and subsequent keypresses toggle back and forth between the two. First-time tuning may experience a slightly longer delay than subsequent measurements as the Qualifier meter learns and stores the exact location of the carriers within the channel. (This will happen once for each function key selection; it can take place here or during the SETUP mode. See section *Quick-Tune Channels Define*.)

Several samples of the tuned channel peak amplitude are measured, averaged, augmented with temperature and characteristic data particular to each instrument, and displayed. The value is displayed as the Qualifier meter changes to a low power mode. Automatic power down occurs if a key is not pressed for 1 minute. Repowering always furnishes the last measurement made before power-down. The value will be blinking to serve as a reminder that a previously measured value is being displayed.

◄ ► *is also active during normal measurement operation; automatic power-down occurs if keys remain idle for 1 minute.*

During measurement mode, if the signal ***is less than -30 dBmV****, the display substitutes* ***LO*** *for the signal level readout. If the signal level is* ***greater than 40 dBmV****, the display substitutes* ***HI*** *for the signal level readout.*

As an additional aid to verification of tuned signals, the Qualifier meter produces a low impedance sound signal, provided through the earphone jack in the Qualifier meter's case. This sound signal is extracted by the Qualifier meter from sound, picture, digital, or other carriers. When a channel is tuned by pressing an arrow key or one of the function keys, sound can be heard through an earphone connected to the earphone jack. The sound is turned on 15 seconds for video and 20 seconds for audio. (This is to preserve battery power.)

Signal level measurements are made by **(a)** powering-on the Qualifier meter, and **(b)** selecting the channel to tune: first the picture carrier, then the sound carrier.

Making Measurements

STEP	KEYPRESS	RESULTS
1.	ON/OFF	Power-on the Qualifier meter.
2.	F1 or F2 or F3 or F4 or F5 or F6	Requests tuning to pre-defined location, measures value, displays value of the picture carrier; a second press of the key toggles to the sound carrier, another press toggles back to the picture carrier. Pressing **F1** for instance, displays the picture carrier of that channel; pressing **F1** again displays the sound carrier; pressing **F1** yet again displays the picture carrier again. (Channels with a second audio carrier behave differently: see the next page.)
3.	◀ ▶	Allows tuning from the currently displayed channel to another in the country set sequence. As each channel has a picture and a sound carrier channel, the sequence would be *picture - sound - picture* if starting from a sound channel, or *sound - picture - sound* if starting from a picture channel.

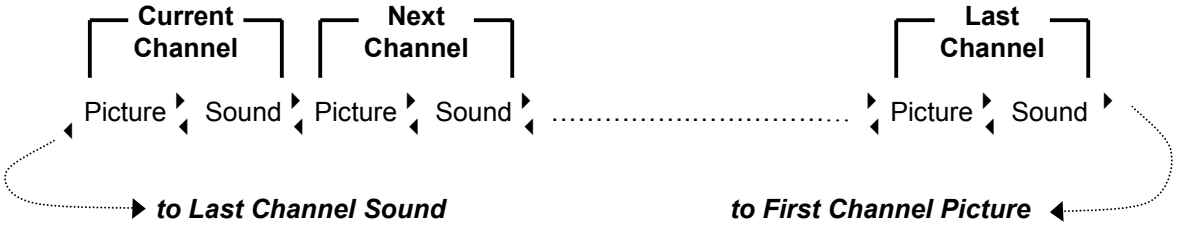
Note:

For user modified channel sets containing digital channels, a '**d**' appears when a digital channel is selected. A digital channel has just one tuning selection. It does not have separate picture and sound carrier measurements. When a digital channel is selected, pressing ◂ moves to the next lower channel or pressing ▸ moves to the next higher channel.

If the Qualifier meter displays the picture carrier for Channel 3, for instance, pressing ▸ displays the sound carrier of Channel 3; pressing ▸ again displays the picture carrier of Channel 4. If the Qualifier meter displays the sound carrier for Channel 3, pressing ▸ displays the picture carrier of Channel 4; pressing ▸ yet again displays the sound carrier of Channel 4.

Similarly, if the Qualifier meter displays the picture carrier for Channel 3, pressing ◂ displays the sound carrier of Channel 2; pressing ◂ yet again displays the picture carrier of Channel 2. If the Qualifier meter displays the sound carrier of Channel 3, pressing ◂ displays the picture carrier of Channel 3; pressing ◂ yet again displays the sound carrier of Channel 2.

When pressing ▸ at the upper range, or ◂ at the lower range, the tuning loops back. Pressing ▸ when the Qualifier meter displays the sound carrier of the last channel causes the device to display the picture carrier of the first channel. Pressing ◂ when the Qualifier meter displays the picture carrier of the first channel causes the device to display the sound carrier of the last channel.



The Qualifier's tuning hierarchy

Making Measurements
(Second Audio Carrier Channels)

Some Country Sets include channels with second audio carriers; the keypress sequences for these channels are different.

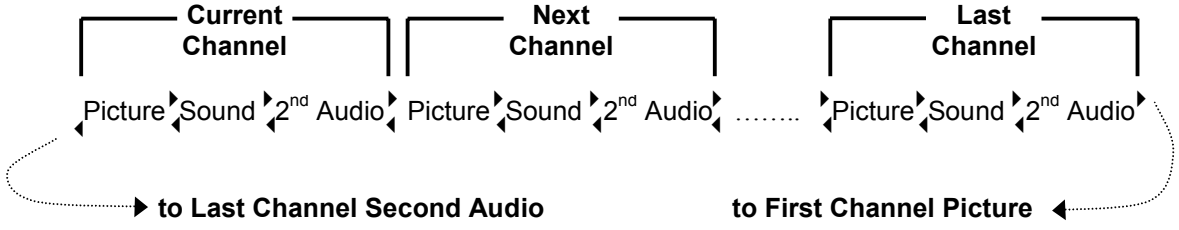
STEP	KEYPRESS	RESULTS
1.	ON/OFF	Power-on the Qualifier meter.
2.	F1 or F2 or F3 or F4 or F5 or F6	Requests tuning to pre-defined location, measures value, displays value of the picture carrier; a second press of the key toggles to the sound carrier, a third press toggles to the second audio carrier, and a fourth press toggles back to the picture carrier. Pressing **F1**, for instance, displays the picture carrier of that channel; pressing **F1** again displays the sound carrier; pressing **F1** yet again displays the second audio carrier; pressing **F1** once more displays the picture carrier again.
3.	◀ ▶	Allows tuning from the currently displayed channel to another in the country set sequence: *sound - 2nd audio - picture - sound* if starting from a picture carrier, or *2nd audio - picture - sound - 2nd audio* if starting from a sound carrier, or *picture - sound - 2nd audio - picture* if starting from a second audio carrier.

Note:

For user modified channel sets containing digital channels, a '**d**' appears when a digital channel is selected. A digital channel has just one tuning selection. It does not have separate picture and sound carrier measurements. When a digital channel is selected, pressing ◀ moves to the next lower channel or pressing ▶ moves to the next higher channel.

If the Qualifier meter displays the picture carrier for Channel 3, for instance, pressing ▶ displays the sound carrier of Channel 3; pressing ▶ again displays the second audio carrier of Channel 3; pressing ▶ again displays the picture carrier of Channel 4. If the Qualifier meter displays the sound carrier for Channel 3, pressing ▶ displays the second audio carrier of Channel 3; pressing ▶ displays the picture carrier of Channel 4; pressing ▶ yet again displays the sound carrier of Channel 4.

Similarly, if the Qualifier meter displays the picture carrier for Channel 3, pressing ◀ displays the second audio carrier of Channel 2; pressing ◀ again displays the sound carrier of Channel 2; pressing ◀ yet again displays the picture carrier of Channel 2. If the Qualifier meter displays the sound carrier of Channel 3, pressing ◀ displays the picture carrier of Channel 3; pressing ◀ yet again displays the second audio carrier of Channel 2; pressing ◀ yet again displays the sound carrier of Channel 2.

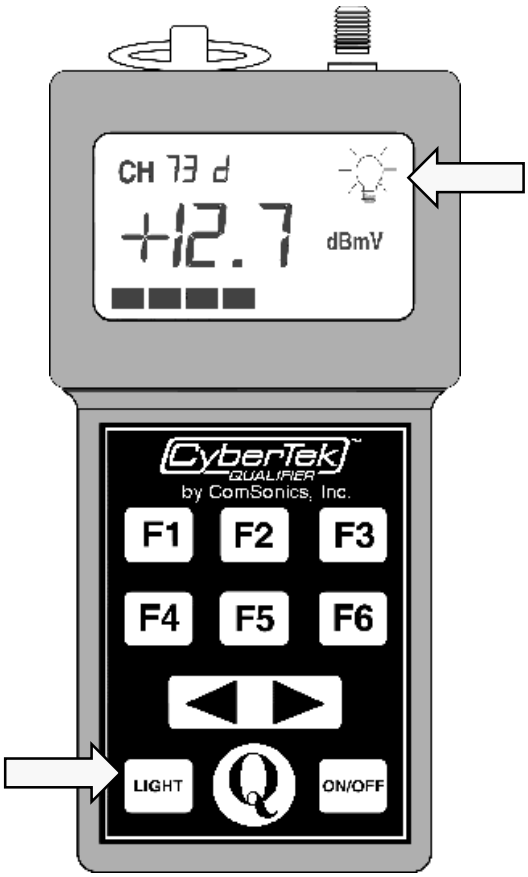


The Qualifier's tuning hierarchy for channels with a second audio carrier

Backlight

As a standard feature, the LCD is provided with a backlight to enable the instrument's use in low lighting conditions. Backlights require extra power and will significantly reduce available battery life.

The Qualifier meter features automatic backlight deactivation and reactivation at strategic points during normal use. Pressing the **LIGHT** key illuminates the backlight. After 10 seconds, the backlight automatically deactivates. After deactivation and prior to power-down, the backlight will reactivate with each function keypress as well as with the **LIGHT** key, automatically deactivating 10 seconds after each keypress. When the backlight is on, pressing the **LIGHT** key turns the backlight off.



FCC License Requirement

A FCC license is required to operate the CyberTek Home Qualification System, specifically the transmitter component. Contact your ComSonics representative for assistance in this matter.

CAUTION !

The Cybertek Home Qualifier System must be installed in a service vehicle equipped with a 12-volt negative ground electrical system.

Home Qualifier System - Overview

ComSonics Cybertek Home Qualifier System provides a method for identifying the internal shielding integrity of the CATV network in a subscriber's home without the need to enter the premises. A Test Source Transmitter (TST), installed in a service vehicle, generates a RF envelope that blankets the home. A Test Key Transmitter (TKT) is located within the Qualifier meter, a hand held unit. The TKT provides an activation signal to the TST in the service vehicle and sets up the Qualifier meter to measure levels of ingress from the TST signal appearing in the upstream path. With the Qualifier meter connected to either the home ground block or the drop at the tap, a press of the Qualifier meter's "Q" key instructs the TKT to activate the TST. The TST generates a brief 5-watt pulse at a frequency just above the CB radio band. The frequency is factory set and is within the upstream spectrum. The TST signal envelopes the home with a level of about +58 dBmV (assumes the service vehicle is about 75 feet from the home). Shielding flaws within the in-home cabling allow the TST signal to enter the upstream path and to the Qualifier meter test connection. The Qualifier meter performs measurements at precisely the right time to detect, measure, and display the level of the TST signal at the selected connection point.

Basic steps for qualifying a home:

1. Park the Qualifier equipped service vehicle near the home you are qualifying. Preferably about 75 feet from the home and no greater than 150 feet.
2. Set the transmitter power switch to ON.
3. Disconnect the CATV drop cable from the home ground block / splitter. An alternative method is to disconnect the drop at the tap / pedestal.
4. Use a short jumper cable to connect the Qualifier meter to the appropriate ground block terminal for testing. If using the tap / pedestal method, connect the meter to the free end of the drop cable. If needed, use a quality extension cable and a F-81 barrel. Make sure the connectors are tight. You will be measuring a Qualifier system generated test signal ingressing into the home cabling that would normally travel to the headend in the upstream path.
5. Power the Qualifier meter ON.
6. Press the "Q" key to enable the meter's Qualifier Mode.
7. Press the "Q" key a second time to activate the transmitter and to initiate the measurement sequence.
8. The yellow TX light on the transmitter illuminates and the home is enveloped by a 5-watt test signal burst.
9. The meter detects and measures the level of test signal ingress into the home.
10. The meter displays a level measurement indication of test signal ingress.

Hint:

- For a high level reading from a tap / pedestal location, retest from the home ground block / splitter location.
- For a high level reading when connected to the input of a home splitter, disconnect each cable from the splitter output (one at a time) and retest to determine the path of ingress.

Hardware Installation

This section covers the installation of the Qualifier Vehicular Mounted Transmitter and Dual Band Antenna in a Vehicle with a 12-volt negative ground.

The Qualifier Meter is a battery powered hand held unit, and requires no installation.

Planning Your Installation

Magnetic Mount Dual Band Antenna - The antenna is placed near the center of the vehicle roof with the cable running perpendicular to the centerline of the roof. The antenna cable is approximately 15 feet long and connects to the transmitter.

Transmitter Assembly - The transmitter is permanently mounted and electrically grounded in the passenger or cargo compartment of the vehicle. The transmitter requires a mounting space of approximately 4 1/2 inch by 10 1/4 inch. An additional clearance of approximately 1-inch may be required for the transmitter cables. A 6 1/2 inch ground cable connects the transmitter mounting bracket to the chassis of the vehicle. Maintain access to the transmitter front panel power switch and indicators. Turn the transmitter off when not needed. This will reduce any unnecessary drain on the vehicle battery during extended periods of non-use. Use the hardware supplied with the system.

Transmitter Powering Cable - The cable assembly is approximately 16 feet long and connects the transmitter to the vehicle battery. The cable has two sections. The longer section is approximately 15 feet long and extends from the transmitter into the vehicle engine compartment or battery location. The shorter section is the fused battery cable. It connects to the longer section and to the vehicle battery terminals. The fused battery cable is approximately 1 foot long.

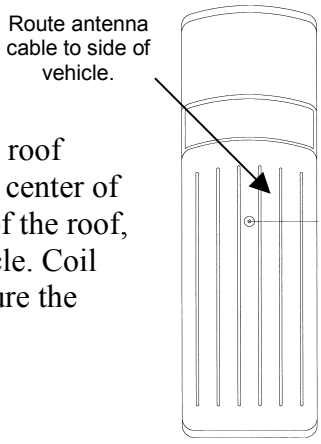
Installing Your System

Please observe the following while installing your system.

- Wear eye protection when installing the system and working near a vehicle battery.
- When disconnecting battery cables in a vehicle, remove the Negative (- black) battery terminal first. Then remove the Positive (+ red) battery terminal last. Reconnect the Positive (+ red) terminal first and the Negative (- black) terminal last.
- Vehicle must have a 12-volt negative ground electrical system.
- Insure no mounting hardware makes contact with any wiring, fuel/brake lines or other components.
- Insure the mounting position of the transmitter is clear of obstacles.
- Protect the system from metal debris.
- Do not route wiring through sharp edged openings or potential pinch points to prevent future failures and safety hazards.
- Maintain at least one inch of clearance around the transmitter for proper cooling.

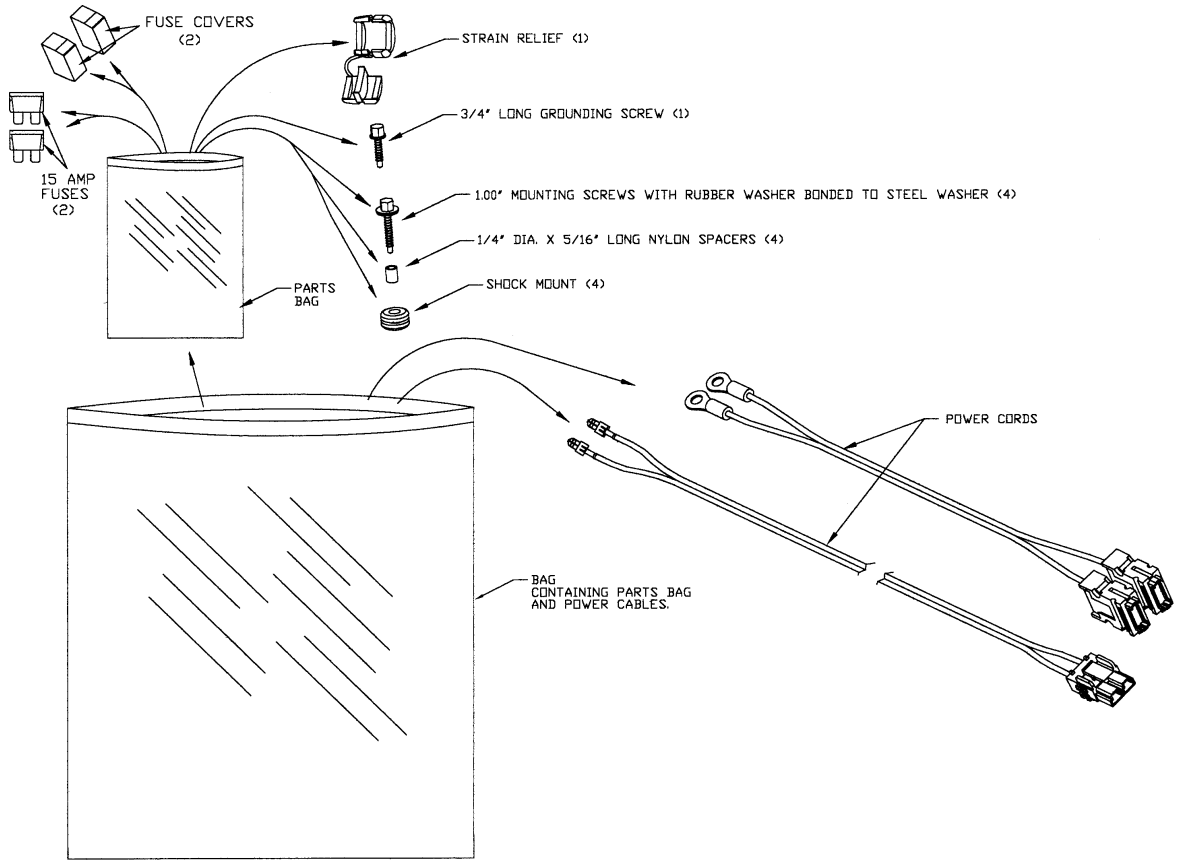
Install the Antenna

Place the Magnetic Mount Dual Band Antenna on a flat roof surface of the vehicle. Position it near as possible to the center of the roof. Run the cable perpendicular to the centerline of the roof, to the point where the antenna cable will enter the vehicle. Coil any excess cable in a loose loop inside the vehicle. Secure the cable as necessary.



Prepare to Install the Transmitter

Check the hardware in your Qualifier Transmitter Installation Kit (part number 101275-001) with the following illustration.

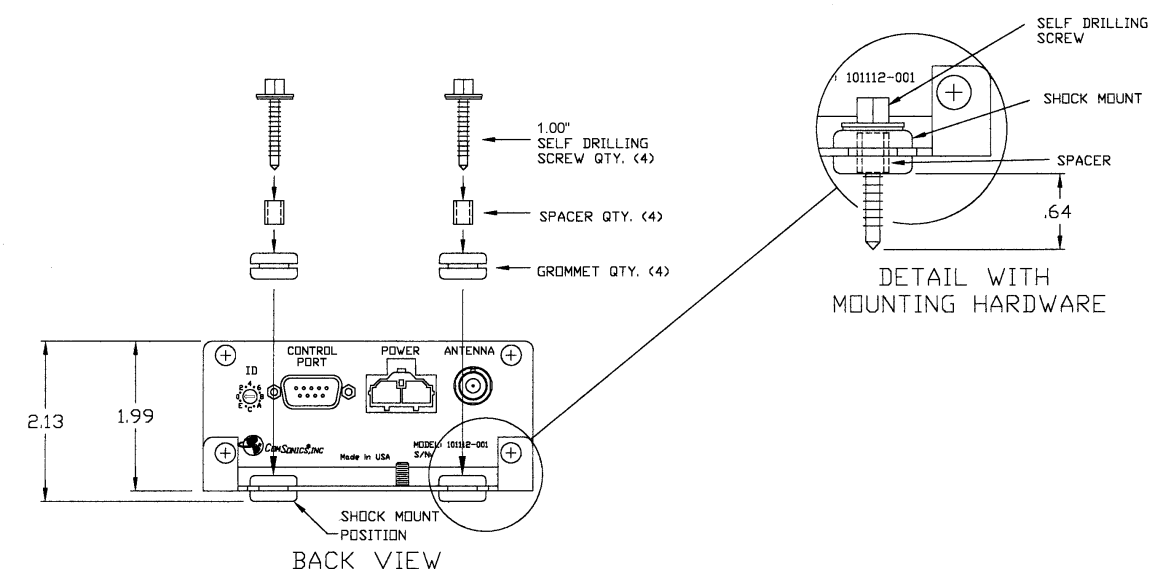


Use the hardware contained in the kit to mount the transmitter as follows.

Mount the Transmitter

1. Place the four (4) rubber shock mounts into the four (4) slots/holes of the mounting bracket.

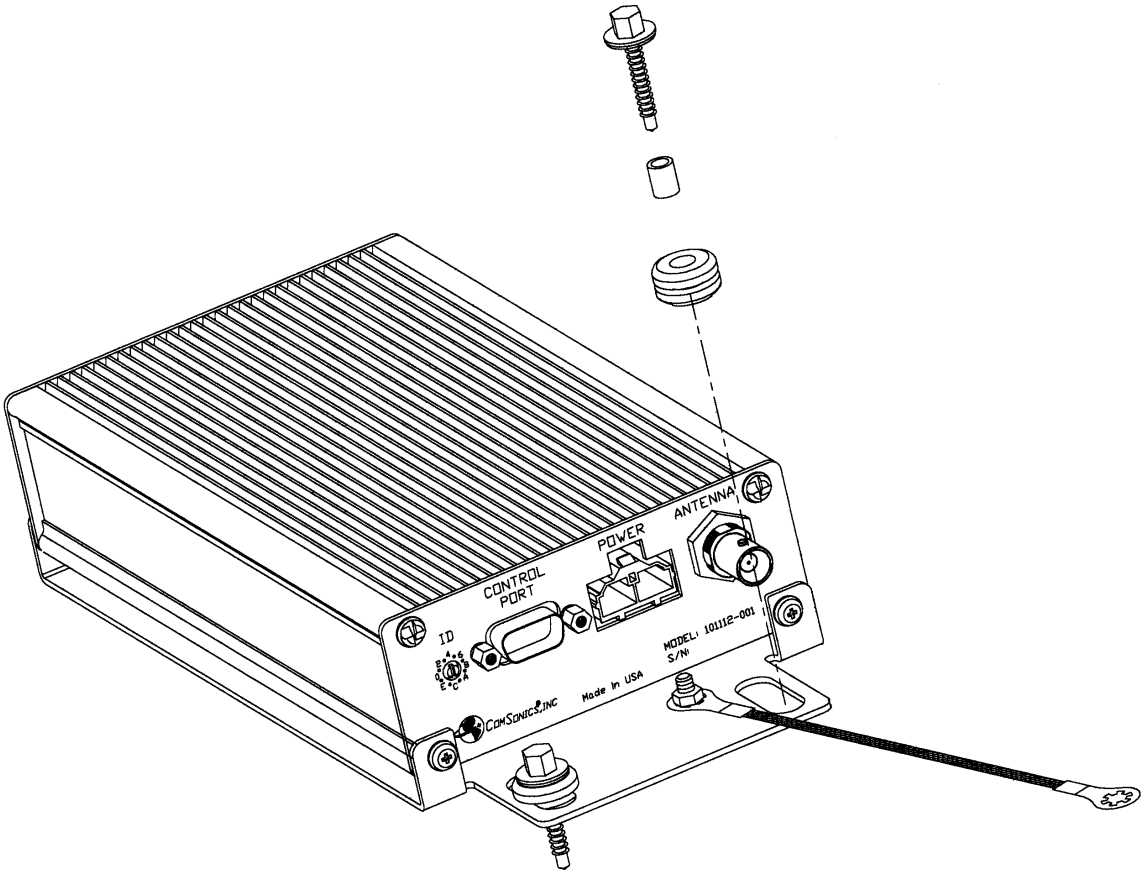
2. Place the four (4) nylon spacers, one each into the center of each shock mount.



3. Adjust the shock mounts in the bracket slots as needed for a secure installation in the selected location.

4. Place the transmitter with mounting bracket over the selected mounting location. Allow at least 1 inch beyond the rear end of the bracket for installation of cables. Mark the location of the four mounting holes using a center punch.

5. Protect the transmitter from debris. Use a 1/4-inch nut driver attached to a power screwdriver or variable speed drill. Install four (4) one-inch self-drilling screws to secure the transmitter at the selected mounting location. DO NOT OVER TIGHTEN SCREWS! Remove any debris remaining from the drilling operation.

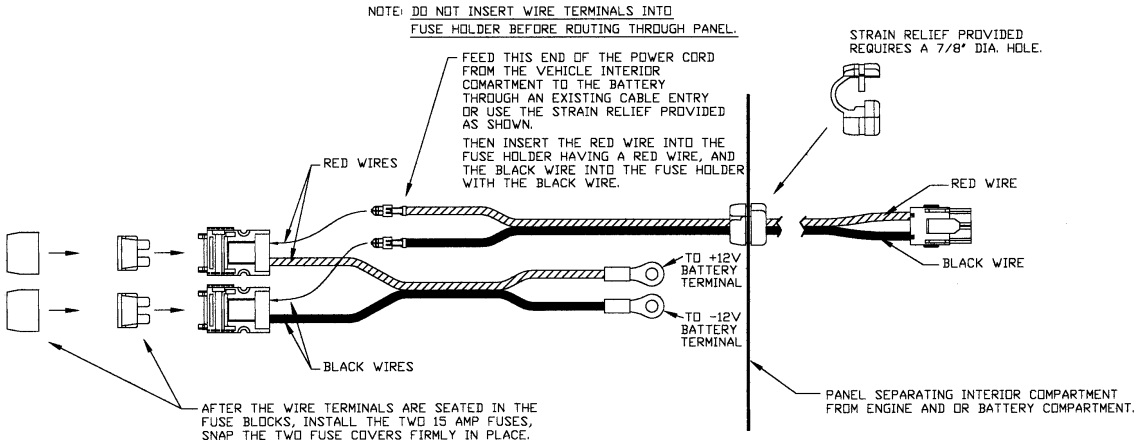


6. Select a location for mounting the ground strap to the vehicle chassis. This must be a metal surface fully connected to the vehicle ground. Mark the hole for the ground strap using a center punch. Remove any paint from the area of the hole to provide a good electrical connection between the ground lug and the vehicle chassis.

7. Use a 1/4-inch nut driver attached to a power screwdriver or variable speed drill. Install one (1) 3/4-inch self-drilling screw through the ground lug into the chassis at the marked location. DO NOT OVER TIGHTEN SCREW! Remove any debris remaining from the drilling operation.

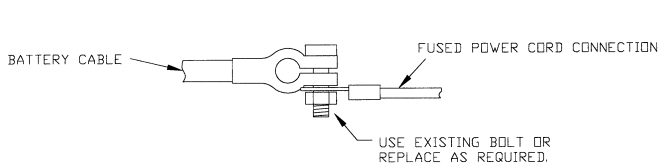
Install Transmitter Power Cable Assembly

1. Install the 15-foot Transmitter Power Cable Assembly. On one end is a factory installed connector for the Transmitter Power Jack. The other end has bare metal contacts only. Route the 'contacts only' end of the cable from the passenger or cargo compartment of the vehicle to the Engine/Battery Compartment. Use an existing access point or drill a 7/8-inch hole between the compartments. Route the cable through the hole, and to the battery. Install the strain relief provided to protect the cable. Seal any air leaks resulting from the installation.

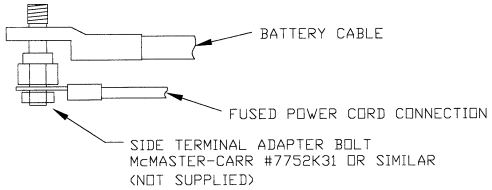


CAUTION - SAFETY NOTE
Wear eye protection when drilling or working near a vehicle battery.
When disconnecting battery cables in a vehicle: Remove the Negative (- black) battery terminal first. Then remove the Positive (+ red) battery terminal last. Reconnect the Positive (+ red) terminal first and the Negative (- black) terminal last.

2. Connect the 1-foot Fused Battery Cable to the vehicle battery.
   Post type batteries: Remove the nuts from each of the two battery clamps. Install the ring terminals on the bolts, Red Wire to the Positive (+) battery terminal and Black Wire to the Negative (-) ground terminal. Reinstall the nuts to secure the ring terminals to the clamps.
   Side terminal batteries: Remove the bolts from each of the two battery terminals. Reinstall vehicle battery cables using side terminal adapter bolts (see illustration). Tighten the adapter bolts. Connect the Red Wire to the Positive (+) battery bolt, and Black Wire to the Negative (-) battery bolt. Tighten the nuts to secure the lugs to the adapter bolts.



POST TERMINAL CONNECTIONS



SIDE TERMINAL CONNECTIONS

3. **CAUTION - <u>DO NOT</u> REVERSE WIRES IN THIS STEP!**
   Connect the bare metal contacts on the 15-foot Transmitter Power Cable to the open side of the fuse holders (see illustration).
   - Slide the **Red** wire with the bare contact into the empty hole on the fuse holder that already has one Red wire installed. This is the Red wire that connects to the positive battery terminal.
   - Slide the **Black** wire with the bare contact into the empty hole on the fuse holder that already has one Black wire installed. This is the Black wire that connects to the negative battery terminal.
4. Install a 15 Amp fuse in each of the two fuse holders. Install a cover over each fuse.
5. Make sure the Transmitter Power Switch is set to OFF. Connect the Antenna Cable to the rear panel Antenna BNC Jack. Connect the Power Plug to the Transmitter rear panel power Jack.
6. Set the Transmitter Power Switch to ON and check that only the POWER indicator illuminates.

Test the Qualifier System Installation:

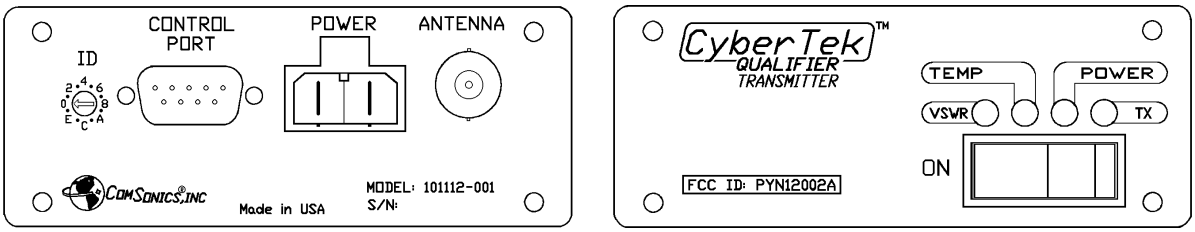
1. Set the transmitter power switch to ON.
2. Insert a two-inch length (approximate length) of small wire into the input connector on the Qualifier meter. Use a small wire size to avoid damaging the input connector.
3. Hold the Qualifier meter about ten feet from the service vehicle.
4. Power the meter ON. (Charge the meter prior to performing this test, if needed.)
5. Press the “Q” key to enable the meter’s Qualifier Mode.
6. Press the “Q” key a second time to activate the transmitter and to initiate the measurement sequence.
7. The yellow TX light on the transmitter illuminates.
8. The meter detects and displays a level of the test signal from the transmitter.

Note: Insure the Receiver and Transmitter User Identifier (RUID) settings match. See the *System Operation Section* for details.

System Operation

The transmitter is installed in the service vehicle (See section *Hardware Installation*). The Qualifier meter activates the transmitter by using a radio frequency Command Link. A press of the "Q" key turns on the Command Link, when the meter is in *Qualifier Mode.* This allows the meter to remotely activate the transmitter. When the transmitter is actively transmitting, a series of test signal bursts (at the factory pre-set frequency) are radiated at 5 watts from the antenna. If the test signal bursts ingress into the home, the Qualifier meter verifies and measures the signal. It then displays an absolute or a relative level reading. (See section *Qualifier meter*).

Qualifier Transmitter Details



Rear Front

Receiver User Identifier (RUID) Rotary Switch
The ID Rotary switch has 0-F (16) possible values. This allows transmitter activation by only a Qualifier meter that sends a particular identifier code in the command link. This allows more than one Qualifier System to service a neighborhood without interference from one another. The factory default setting is '0'.

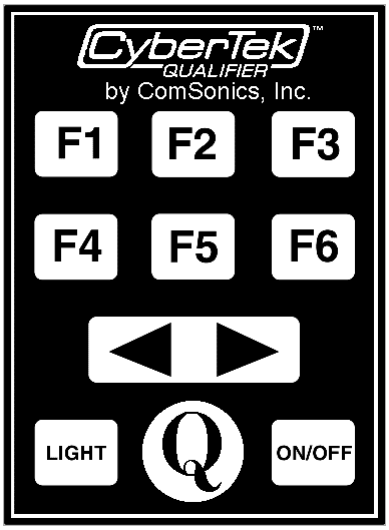
Power Light (Green)
When powering the transmitter, this light will illuminate after the unit has finished internal initialization and has determined that no current fault modes are active. If an over-temperature fault condition is active, this light will not illuminate.

TX Light (Yellow)
When the transmitter is activated by a Qualifier meter, this light illuminates during the test signal transmission to confirm the Command Link is functional and a test signal has been generated.

VSWR Light (Red)
This light illuminates when there is an improperly matched antenna. In this fault condition, this light only illuminates when the transmitter activates to generate a test signal. To correct this fault, check the antenna and cycle the power.

Temperature Light (Red)
This light illuminates when the internal temperature of the transmitter exceeds the operating limits. The transmitter shuts down in this condition and will not function until an acceptable temperature is established. Maintain at least one inch of clearance around the transmitter for proper cooling.

Qualifier Meter Details

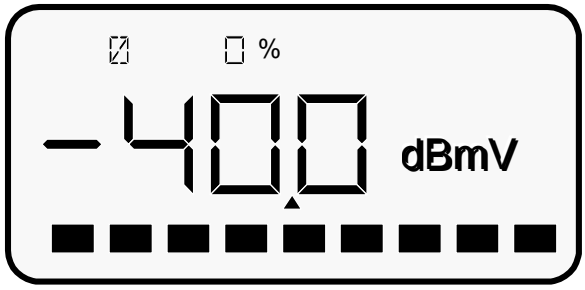


The Qualifier meter includes the same functions as the ComSonics WindowLite Installer Digital meter. Additionally, the Qualifier meter has a *Qualifier Mode* that is activated by pressing the "Q" key on the device.

The following keys are active in Qualifier mode:

"Q" Key
Pressing this key when in *Qualifier Mode* enables the Command Link. This commands the transmitter to send a burst of carriers in order to make a measurement. If the Qualifier meter detects the carrier, it will measure the signal strength and display that measurement level in dBmV.

This display example represents the meter's initial display after one press of the "Q" key. Press the "Q" key a second time to activate the transmitter. The meter performs a series of measurements to identify the transmitter's test signal. It then displays the level measurement and a relative percentage reading based on the threshold value.



F1 Key (Toggles Automatic / Manual)
Press the F1 key to select between using an Automatic Threshold ("A") or a Manual Threshold ("M") mode. An "A" or a "M" appears in the upper left corner of the display. The F1 key determines which threshold is used when making the qualifying measurements.

> **Automatic** – The meter is set to a default factory threshold value of 12 dBmV. Each subsequent measurement will be used in a rolling average to tailor the unit to the cable system's typical level. The threshold can be reset to the factory default threshold level at any time by pressing the F2 key.
>
> **Manual** – The user can set a threshold between 2-22 dBmV using the F3 key and the arrow keys.

F2 Key (Automatic Reset)
Press the F2 key to reset the Automatic Threshold to the factory default of 12 dBmV and reinitialize the rolling average.

F3 Key (Manual)
Press the F3 key to display the current manual threshold value (preset at the factory to 12 dBmV). Use the Arrow keys (< or >) to change the value. The range of threshold values are between 2-20 dBmV. Press the F6 key to exit this mode and return to the Main *Qualifier Mode*.

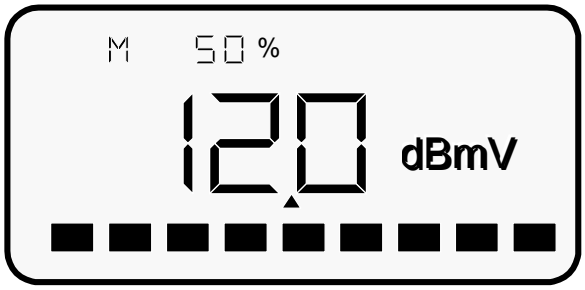
F4 Key (RUID)
Press the F4 key to set the Receiver User Identifier (RUID) code. The current setting is displayed. Use the Arrow keys (< or >) to change the ID code. The Factory default ID code is "0". Valid ranges are 0-F (16 settings). Press the F6 key to exit this mode and return to the Main *Qualifier Mode*. **Note: Qualifier meters and transmitters used in conjunction must have their ID numbers match for the Qualifier System to function properly. Refer to section on setting the transmitter ID.**

F5 Key (FR)
Press the F5 key to select the receive frequency when in Qualifier mode. **Note: Qualifier meters and transmitters used in conjunction must have their frequencies match for the Qualifier System to function properly.**

F6 Key (Exit)
Press the F6 key to exit *Qualifier Mode* and restore standard signal level meter operation. If the meter was in either the Manual threshold or the RUID mode when the F6 key was pressed, the meter returns to the main *Qualifier Mode.*

Qualifier Meter Display

The meter displays the threshold mode (A or M), a shielding integrity percentage, and the dBmV level of the received test signal.



(The following example uses the factory threshold value of 12 dBmV.)

The percentage reading is a measure of the shielding integrity of the home's internal cabling. It is the level of the received test signal referenced to the threshold value. The percentage scale has a ±16 dB window. A level measurement of -4 dBmV yields a 100% reading and a level measurement of 28 dBmV yields a 0% reading. A higher percentage reading (lower measured level) indicates better shielding integrity. A lower percentage reading (higher measured level) indicates less shielding integrity.

Appendix A: Keypress Reference

KEYPRESS	ACTIVITY or RESULTS
ON/OFF	Toggles Qualifier meter on and off.
F1	Quick-Tune Selection 1: defaults to picture carrier; press again for sound carrier, press again to return to picture carrier*
F2	Quick-Tune Selection 2: defaults to picture carrier; press again for sound carrier, press again to return to picture carrier*
F3	Quick-Tune Selection 3: defaults to picture carrier; press again for sound carrier, press again to return to picture carrier*
F4	Quick-Tune Selection 4: defaults to picture carrier; press again for sound carrier, press again to return to picture carrier*
F5	Quick-Tune Selection 5: defaults to picture carrier; press again for sound carrier, press again to return to picture carrier*
F6	Quick-Tune Selection 6: defaults to picture carrier; press again for sound carrier, press again to return to picture carrier*
◀ ▶	Arrow Keys for channel selection by scrolling.
▶	If tuned to a picture carrier, tunes to the sound carrier of the current channel; if tuned to a sound carrier, tunes to the (next higher) adjacent channel's picture carrier†
◀	If tuned to a picture carrier, tunes to the (next lower) adjacent channel's sound carrier; if tuned to a sound carrier, tunes to the picture carrier of the current channel‡
LIGHT	Toggles LCD backlight on and off.
F6 + ON/OFF	Activates SETUP mode
F6 + ON/OFF , ◀ ▶	Changes Country Set
F6 + ON/OFF , F1 , ◀ ▶	Changes Units of Measure
F6 + ON/OFF , F1 , F2 , F1 ~ F6 , ◀ ▶	Changes Quick-Tune channel settings
ON/OFF , Q , Q	Activates Qualifier Mode with the first press of the 'Q' button. Each additional press of the 'Q' button activates the Qualifier transmitter.
F6	Exits Qualifier Mode and restores standard signal level meter functions.

** **If using a Country Set with channels with second audio carriers:** the first keypress defaults to picture carrier; press again for sound carrier, press again for second audio carrier, press again to return to picture carrier. See 4: Making Measurements.*

*† **If using a Country Set with channels with second audio carriers:** if tuned to a picture carrier, tunes to the sound carrier of the current channel; if tuned to a sound carrier, tunes to the second audio carrier of the current channel; if tuned to a second audio carrier, tunes to the (next higher) adjacent channel's picture carrier.*

*‡ **If using a Country Set with channels with second audio carriers:** if tuned to a picture carrier, tunes to the (next lower) adjacent channel's second audio carrier; if tuned to a sound carrier, tunes to the picture carrier of the current channel; if tuned to a second audio carrier, tunes to the sound carrier of the current channel.*

Appendix B: Channel Line-Up Set and Country Set Codes

CODE	NAME
0	Custom User Set
1	US STD EIA
2	US HRC EIA
3	US IRC EIA
4	Australia
5	BCST US (US Off Air)
6	Belgium
7	Canada
8	China
9	Denmark
10	France
11	Germany
12	Hong Kong
13	India
14	Israel
15	Japan
16	Korea
17	New Zealand
18	Netherlands 1
19	Netherlands 2
20	Poland
21	Sweden
22	Switzerland
23	Taiwan
24	United Kingdom 1
25	United Kingdom 2

Country Set Codes 1 through 25 are included in the Feature Installation Utility as factory default channel groups. Use the utility to view the details of factory groups and to modify a factory group, including the addition of digital channels. Save the modified group under a new user name and send it to the Qualifier meter. The new user group is Country Set Code 0. Factory Channel Set Groups are protected and can not be modified. See section *Feature Installation Utility* for more details.

Appendix C: Feature Installation Utility

The Feature Installation Utility is a Windows 95/98/ME/2000/XP/NT program necessary for the customization and installation of a user defined channel line-up set or group. Digital channel definitions can only be installed by use of the utility. A special interface cable is used with a standard DB-9 serial communications port. An adapter may be needed (not supplied) for computers with DB-25 ports. Only one user defined group can reside in the Qualifier meter. It is selected in the Qualifier meter by choosing country set 0. See section *Country Set Define*.

Install Programmer Utility

Place the CD-ROM into the drive. The installation program will automatically start. If the PC auto-start function is turned off, follow the instructions below to manually install the program.

Manual Install:

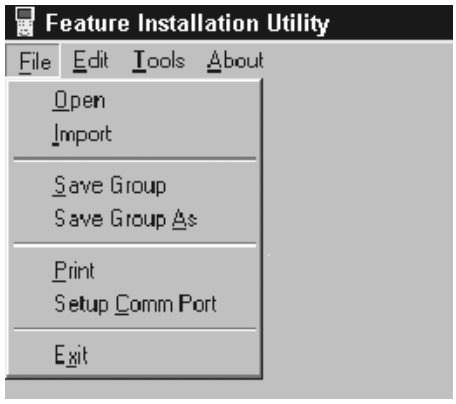
Click Start, then click Run. Type D:\SETUP (If your CD-ROM drive is not D, substitute with your drive letter) or choose Browse and select your drive, then select SETUP.EXE. Click OK and follow on-screen instructions.

Run Programmer Utility

Double-click the desktop icon to start the Utility.

or

From the Program list, move the pointer to Feature Installation Utility. Then click on *Feature Intallation Utility*.



Select a Channel Group

From the File Menu select Open. Click on the selected group. Click OK.

or

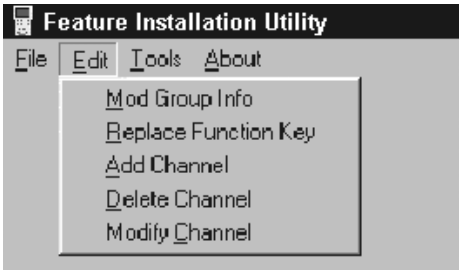
From the File Menu select Import. A properly formatted text file can be imported, modified, and saved as a group. Select the text file to import and click on Open.

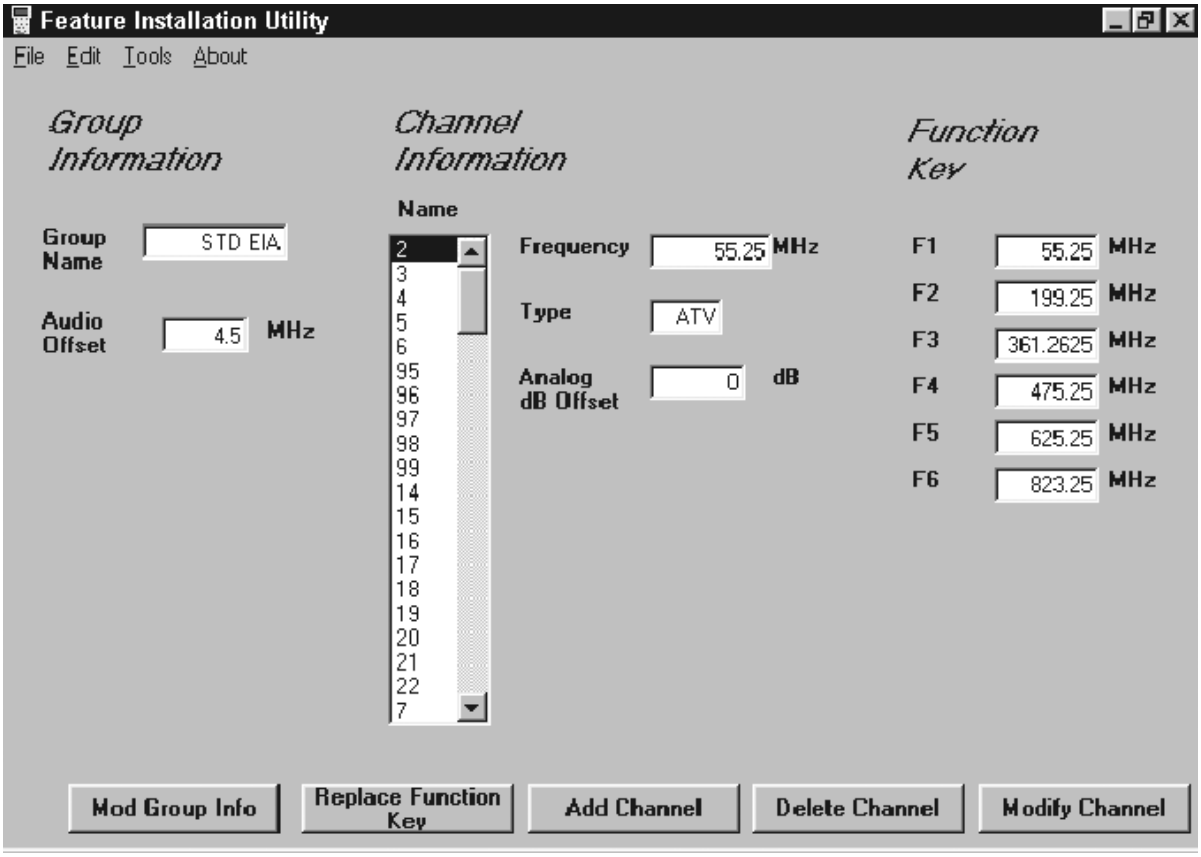
Note: *For a sample of the format needed for an import file, open a copy of a factory default group in a text editor program.*

Modify the Channel Group

From the Edit Menu or by use of the Command Buttons select and modify these properties.

- Group Information
- Function Key (Quick-Tune) Channels
- Add Channel
- Delete Channel
- Modify Channel





Save the Channel Group

From the File Menu select Save Group As to rename the group. Modified factory default groups must be renamed. If the current group is a user group and is to be saved under the same name, select Save Group.

Print the Channel Group Information

From the File Menu select Print. A tabular listing of the current group is sent to the default printer.

Send Group to Unit

From the File Menu select Setup Comm Port. Select the proper communications port and click OK.

Connect the communications cable and power on the Qualifier meter while holding the F1 key. SL and CL appear on the Qualifier meter's display.

From the Tools Menu select Send Group to Unit.

Groups containing: digital channel descriptions, more than 128 channels, or analog dB offsets will not load into non-digital units.

Modify Group List

From the Tools Menu select Modify Group List. Select the group to remove and click Delete Group.

Only user defined groups are listed. Factory default groups are protected and can not be deleted.

Exit Feature Installation Utility

From the File Menu select Exit.

or

Click the Close button in the upper right corner of the display.

Access Installed Channel Group

With the Qualifier meter off, press and hold F6 while powering the unit on.

Press an arrow key to select country set 0.

> **Important:** If the Qualifier meter was on country set 0 during the installation, scroll to country set 1 and then back to country set 0 to properly load the new set.

Power the unit off.

The installed channel group is active on the next power-up.

See section *Country Set Define* for detailed instructions.

Appendix D: Pressure Relief

The Qualifier meter case is sealed against water. Because of this seal, taking the Qualifier meter to extremes of air pressure (e.g., from sea level to a very high elevation) may cause air pockets within the keypad. To alleviate this, the Qualifier meter is fitted with a pressure relief "valve": a Phillips screw directly beneath the label on the back of the unit.

Loosen the screw a few turns and wait five minutes for the air pressure within the unit to equalize.

Do not forget to re-tighten the screw after performing this action!

Appendix E: Battery Replacement

Eventually, repeated depletion and recharging of the battery will decrease the battery's efficiency and require its replacement. Care must be taken when replacing the battery so as to maintain the Qualifier meter's waterproof seal. The following instructions have been provided to make this possible.

1. With the back of the Qualifier meter facing up, remove the screws from the casing. The battery is attached to the back of the unit by a metal bar (see below).

2. Remove the screws holding the metal bar over the battery and remove the bar.

3. Detach the battery's two-pin Methode connector and remove the battery. Discard the old battery properly.

4. Put the new battery in place and attach its two-pin Methode connector. Be sure to insert the connector correctly; the connector should not have to be forced on.

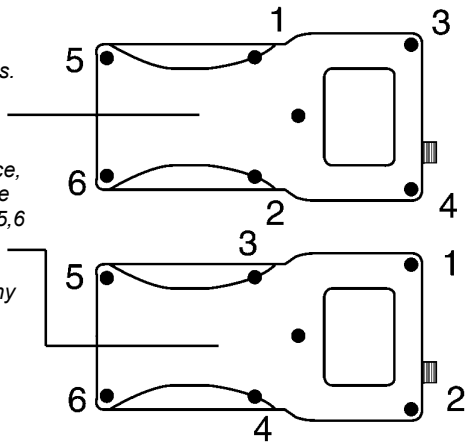
5. Place the metal bar over the battery and replace the screws.

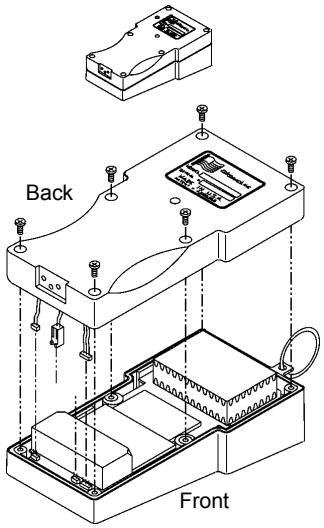
6. Reassemble the case, making sure that none of the internal cables are pinched between the rubber pads and the Qualifier meter's internal parts.

7. Replace the screws, in the order shown.

To Close the Unit:

1. *Loosely reinstall the screws. Tighten to 2 inch pounds in this order; 1,2,3,4,5,6.*
2. *Once all screws are in place, tighten them to a final torque of 4 inch pounds in 1,2,3,4,5,6 order.*
3. *Take care NOT to pinch any wires.*



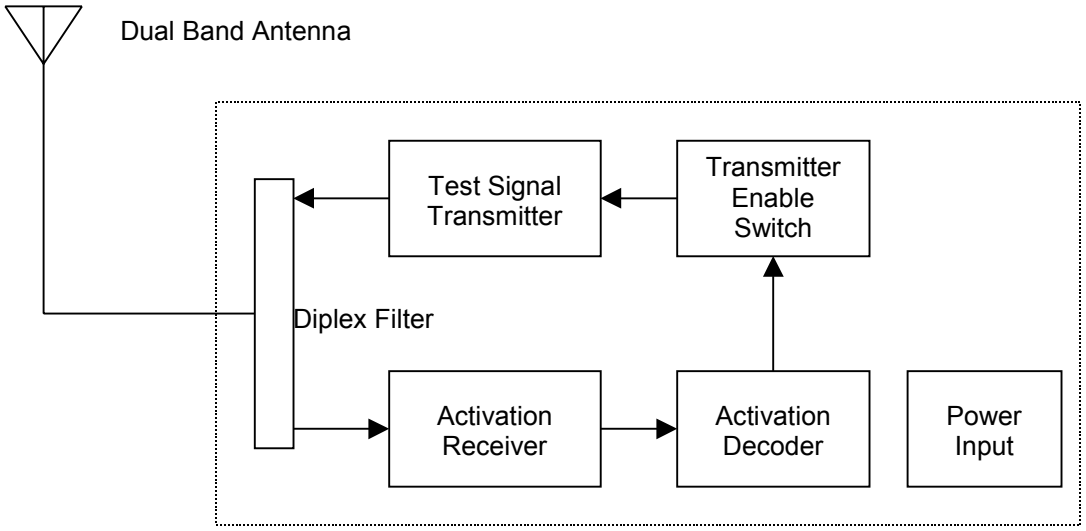


The battery is attached to the case back with a metal bar.

Route the red and black wires as shown.

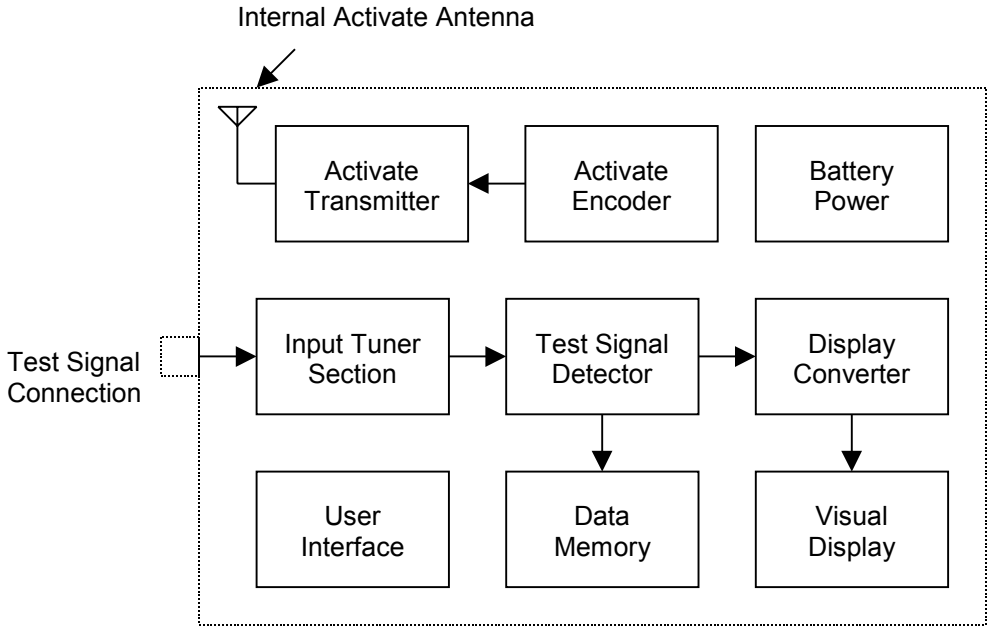
Appendix F: Theory of Operation

Home Qualification System - Transmitter Block Diagram



The transmitter is mounted in and powered from a vehicle. The antenna is mounted on the vehicle's roof. Preferably, place it in a location free of nearby metallic objects. The dual band antenna receives a properly coded activation signal from a meter. The diplex filter routes the activation signal to the activation receiver. The activation decoder determines a code match between the received signal and the setting of the transmitter. When a code match occurs, the decoder activates the transmitter enable switch. Otherwise, the transmitter remains in stand-by mode. The transmitter enable switch causes the transmitter to generate a test signal. The test signal is fed to the dual band antenna by the diplex filter. The diplex filter prevents the test signal from being routed to the activation receiver.

Home Qualification System - Signal Level Meter Block Diagram



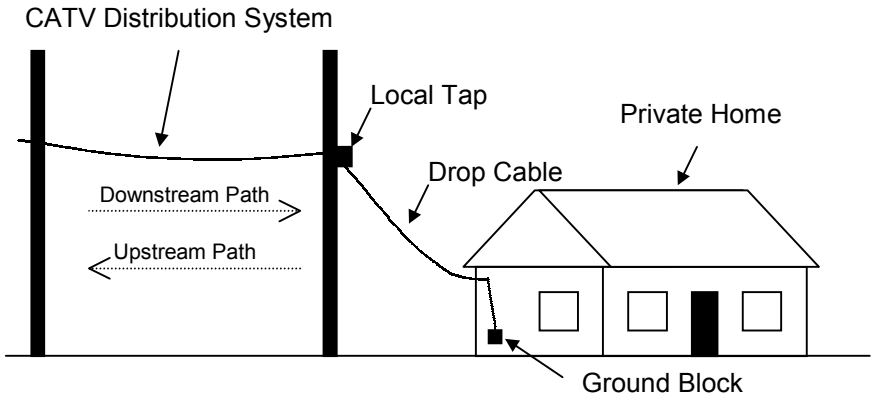
The Qualifier meter is powered by an internal battery and is portable in design.

A test sequence consists of the following steps:

- Meter is connected to ground block or tap / pedestal of home under test.
- User interface operation turns on the activate encoder. The activate encoder has been previously setup to match the intended vehicle transmitter. The activate transmitter is powered on and the activate signal is radiated from the internal antenna.
- The vehicle transmitter receives the activation signal and verifies the coding. If the coding matches, the vehicle transmitter powers on and radiates the home with a test signal.
- The input tuner section receives the test signal resulting from ingress into the home. The test signal detector qualifies the test signal as originating from the test transmitter. If the test signal qualifies, the display converter sends the level measurements to the visual display. A 'Q' factor percentage is displayed.
- Measurement data is stored to data memory by the user interface.

Appendix G: Home Qualification System Generalized Theory of Operation

Exhibit A



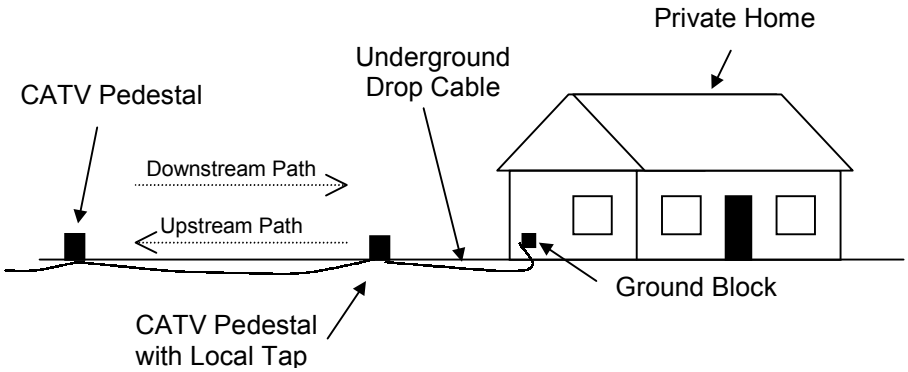
Typical CATV overhead routing to private home.

A cable television system distributes signals by a cable suspended on utility poles or by a cable buried in the ground. A combination of both methods is not uncommon. From the main distribution cable, a device called a local tap is used to interface the distribution system cable to the subscriber. From one to eight and possibly more subscribers may be served from a single local tap location. A multitude of local taps is used through out the distribution system to provide cable services to subscribers.

From the local tap, in overhead systems, a drop cable is suspended from the local tap at a safe distance from the ground and secured to the home. The drop cable is routed down the side of the home to a device called a ground block. The ground block is a pass through device connected to an earth ground. It is used to prevent static build up between the cable system and the electrical power wiring of the home. The ground block reduces the risk of electrical damage to devices within the home connected to the cable system.

The cable enters the home and routes to the device/s within the home. The cable within the home may be split (branched) into a multitude of paths supplying cable services to many locations within the home. Examples of devices connected to the internal cabling are television sets, VCRs, cable modems, digital carrier receivers, and special service transceivers.

Exhibit B



Typical CATV underground routing to private home.

The underground distribution system has the cable buried in the ground. The cable surfaces into above ground enclosures called pedestals. Opening a pedestal allows access to the cable system for maintenance. Distribution pedestals contain local taps and an underground type of cable is used to supply cable services to the home. The underground drop cable usually surfaces just below the ground block.

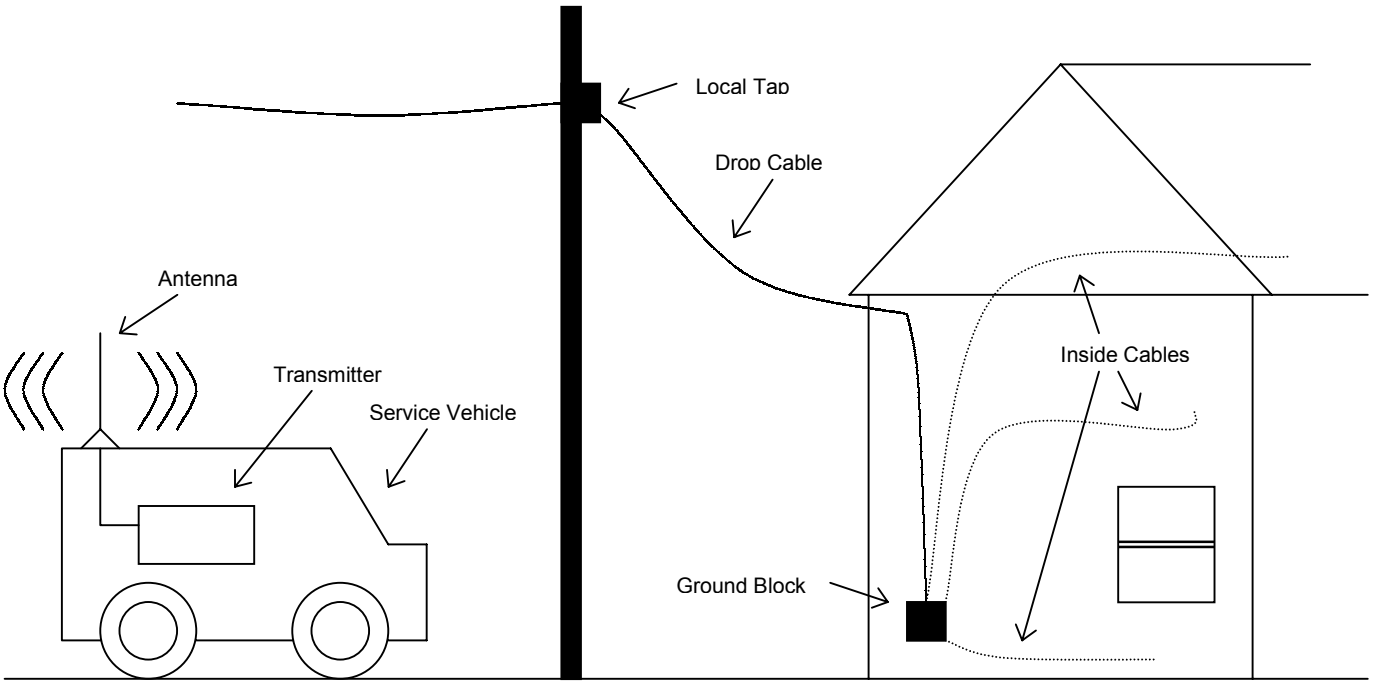
Cable signals coming to the home follow the downstream path. Downstream signals are in the 50 MHz to 1 GHz frequency range. To enable two way communications on a cable system, the upstream path is used for signals originating within the home and traveling to a central location (headend) in the cable system. Upstream signals utilize the frequency range of 5 to 50 MHz. The upstream path is used for devices such as cable modems and special services devices. Examples of special service devices are burglar alarms, fire alarms, and personal health monitors.

Unfortunately, the reliability of the upstream path is vulnerable to the effects from devices that radiate electrical energy in the 5 to 50 MHz frequency range. The upstream path uses digital signals and as such is subject to very unreliable operation if interference signals find their way into the system. Examples of devices capable of causing interference are: CB radios, hair dryers, washing machines, food mixers, toasters, vacuum cleaners, and almost any home appliance that has a motor or a power switch. Interference may occur for an instant or be continuous while the device is on.

Quality CATV cabling practices utilized within the home usually reduce or eliminate the susceptibility of interfering signal ingress.

Ingress problems in the upstream path are compounded by the multitude of homes connected to the CATV distribution system. Any one home is capable of adding an interference signal on the upstream path and inhibiting communications. A multitude of homes, each only adding only a small amount of interference, can also render the upstream path useless. Interference signals add on a power basis.

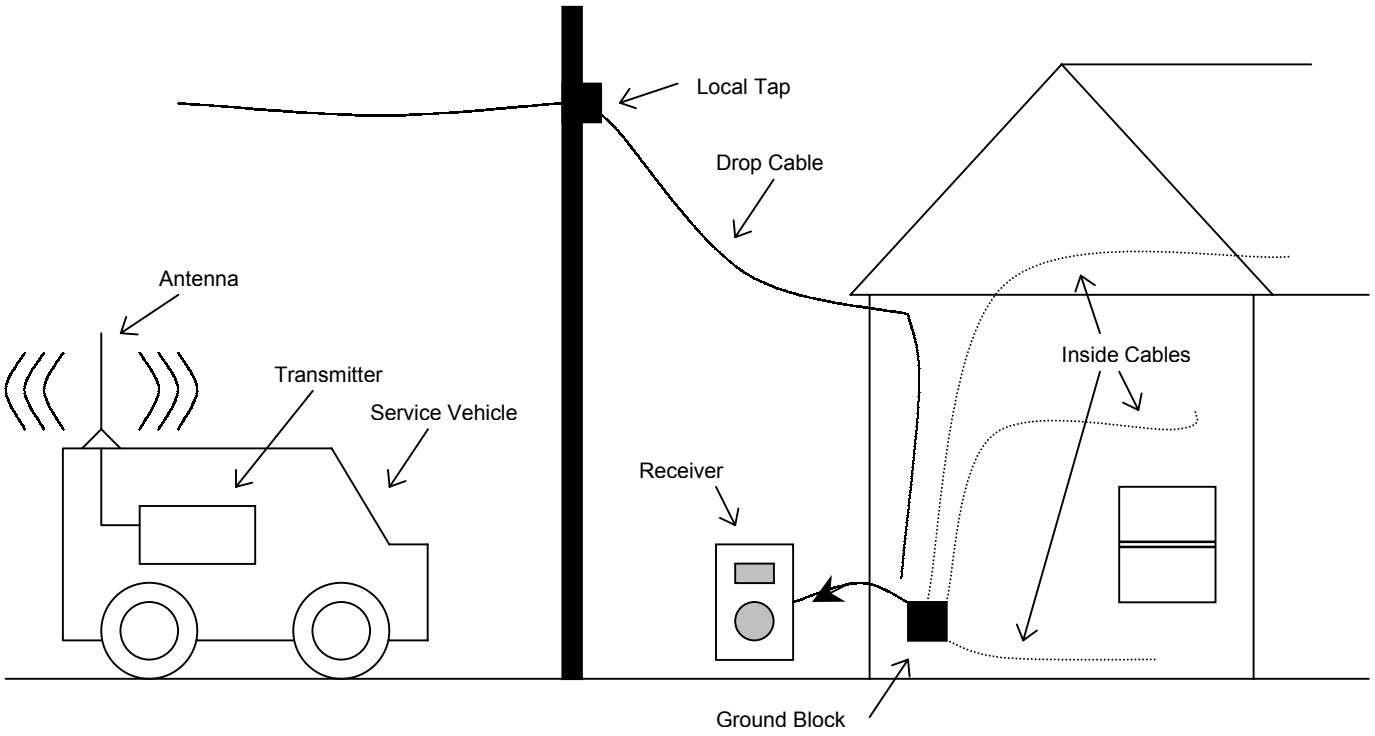
Exhibit C



The CATV cabling inside a home is usually hidden in areas such as craw spaces, behind walls, attics, and basements. The effects of aging on the cable (especially metal connectors), rodent damage, and possibly improper installation reduce the shielding integrity of the system within the home. Poor shielding integrity allows the inside cabling to become a receiving antenna for interfering signals. A signal or noise entering (ingress) the internal cabling has the possibility of traveling to the upstream path and causing problems.

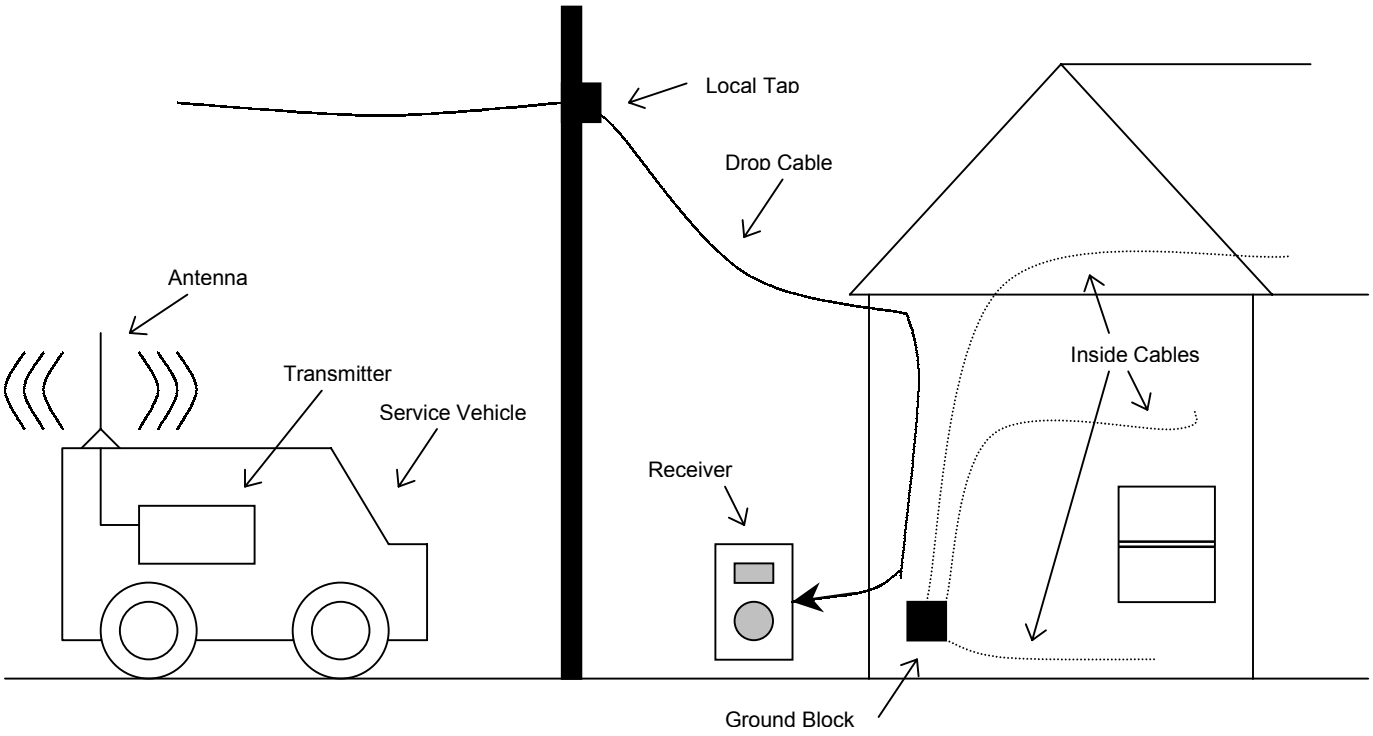
Since all homes have the potential to cause problems in the upstream path, a test is needed to qualify each individual home. If the internal cabling is susceptible to ingress from devices within the home, then it will also have ingress from a known signal source. The known signal source is a mobile transmitter operating on a frequency in the 5 to 50 MHz range. The mobile transmitter is installed in a service vehicle and is powered from the vehicle. An omni-directional antenna is connected to the transmitter and mounted on the vehicle. The antenna is best mounted on the vehicle roof in an area clear of other metallic objects such as other antennas, ladders, and lifting apparatus. The vehicle is parked adjacent to the home (usually between 30 and 150 feet) and the transmitter is powered on. The home is radiated with the test signal. A test signal frequency is chosen as not to cause interference with known upstream communications.

Exhibit D



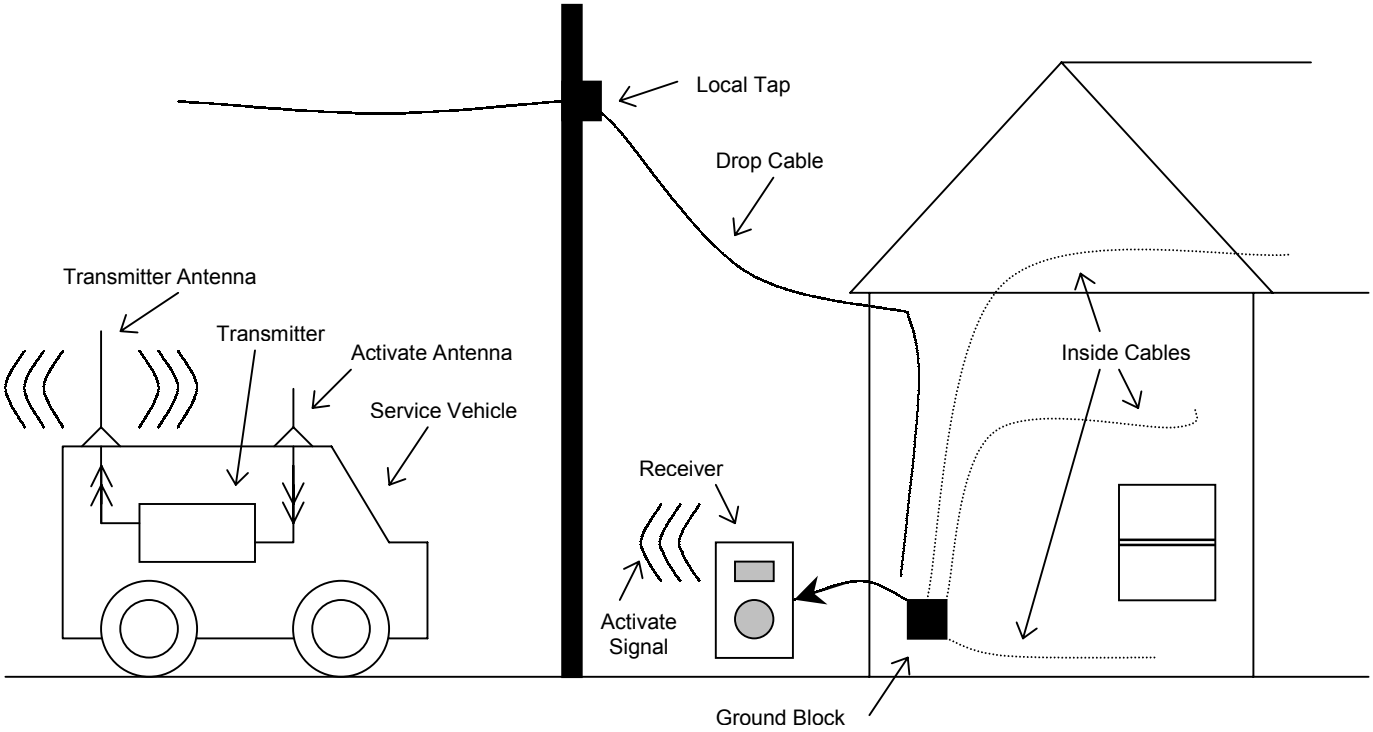
To qualify the shielding integrity of the cabling within the home, the drop cable is disconnected from the ground block. A receiver is connected to the ground block (to the connection the drop cable was removed from) with a length of quality jumper cable. The receiver is tuned to the frequency of the transmitter and measures the level of test signal being received by the internal cabling. The level of the received test signal is compared to a reference standard to determine if the shielding integrity of the cabling within the home is acceptable. Test signal level measurements may be indicated by the receiver in common units of measurement, such as µV or dBmV. The receiver may automatically perform a level comparison and display a 'Q' factor reading. If the measured level of the test signal is greater than acceptable limits, each routing of the internal system may be tested individually to determine the fault. Usually a CATV signal splitter is also the ground block or is located in close proximity to the ground block. Disconnecting individual cables from the splitter and retesting allows for isolating the faulty routing.

Exhibit E



A further test involves testing the drop cable section of the home system. The drop cable is disconnected from the ground block and the drop cable is connected to the receiver. With the mobile transmitter powered on and the receiver tuned to the frequency of the transmitter, the level of test signal is measured. The level of the received test signal is compared to a reference standard to determine if the shielding integrity of the drop cable is acceptable. Test signal level measurements may be indicated by the receiver in common units of measurement, such as µV or dBmV. The receiver may automatically perform a level comparison and display a 'Q' factor reading. A greater than acceptable level measurement would most likely indicate a faulty connection at the local tap.

Exhibit F



An enhancement to the integrity (ingress) test system is the function of the receiver activating the transmitter only when measurements need to be made. Thereby reducing vehicle power drain, transmitter heating, and general RF pollution. Additionally, the activation signal from the receiver is encoded and the transmitter recognizes the encoded activation signal. In this manner, false transmitter activation is eliminated. A multitude of activation codes is available allowing multiple test systems to be in operation in the same vicinity. Only the transmitter associated with a given receiver code activates when needed.

In practice the transmitter and activate antennas are combined into one dual band antenna with a diplex filter at the transmitter/receiver.

A further enhancement is the coding of the transmitter signal. In this manner, the receiver can reject measurements not recognized as those from the test transmitter.

Appendix H: European Community Declaration of Conformity

CE

Manufacturer: ComSonics, Inc.
P.O. Box 1106
1350 Port Republic Road
Harrisonburg, VA USA 22801
Tel. # 540-434-5965

Product: WindowLite™ Installer, CyberTek Qualifier
Models: 100671-001, 100671-002, 100671-003, 101208-001

ComSonics, Inc. of Harrisonburg, Virginia, USA, hereby declares that the above-referenced product, to which this declaration relates, is in conformity with the provisions of:

Council Directive 89/336/EEC (May 3, 1989), on Electromagnetic Compatibility, as amended by Council Directive 92/31/EEC (April 28, 1992), and

Council Directive 73/23/EEC (February 19, 1973), on Low Voltage.

The Technical File required by these directives, including the original of this Declaration of Conformity, are maintained at the corporate headquarters of ComSonics, Inc. (as listed above) and within the European Community at ComTec Cable Accessories, Ltd., Over Industrial Park, Over, Cambridge CB4 5QE, United Kingdom.

Exceptions noted to the above: None