CABLETRONIX™

INSTALLATION AND CONFIGURATION MANUAL

COM1000 HD Headend Solution

for

The Lodging and Commercial Markets

DRAFT

V2.6

TABLE of CONTENTS

This document is an installation and configuration manual for the Cabletronix COM1000 HD Headend Solution serving the Lodging and Commercial markets. This solution incorporates multiple components and products from Cabletronix and other vendors and has been designed and optimized to meet the particular needs of these markets. This document is intended to assist installers with (a) the physical installation of each component, (b) the physical connections among components, (c) component and system configurations, (d) software installation, (e) the creation of channel assignments and (f) basic troubleshooting. This document is not a substitute for any user or technical documentation associated with non-Cabletronix products. Where such documentation is required it is recommended the installer/user contact the appropriate vendor.

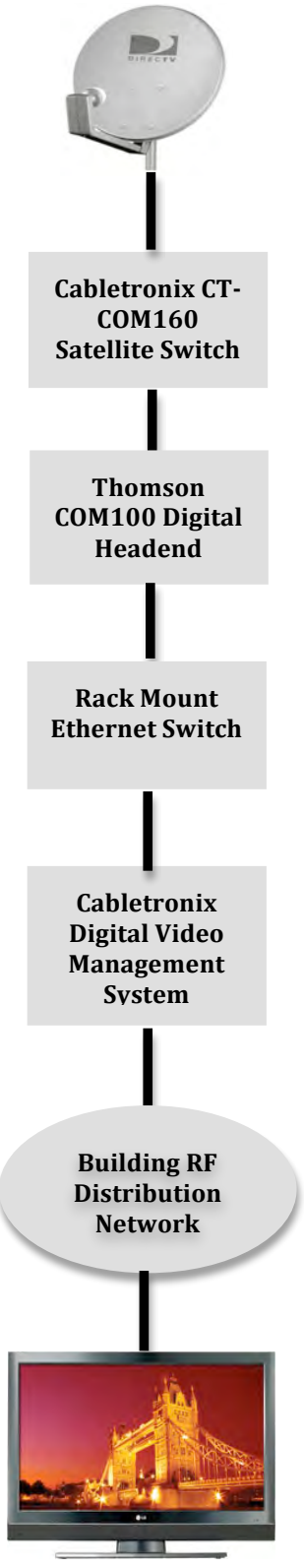
I. SYSTEM INTRODUCTION AND OVERVIEW

The explosive growth of high definition (HD) content is regarded as a significant "must-have" asset among property owners in the lodging and commercial property markets. Yet to deliver this content these same property owners require an affordable HD headend that is both flexible and scalable. At the same time HD content providers need to ensure their HD programming remains secure from signal theft and content piracy. Therefore, content encryption and decryption is a key element in any HD headend solution for these markets.

The Cabletronix COM1000 HD Headend Solution addresses these needs through the integration of commercially available components and use of Pro:Idiom encryption. These components include:

- Thomson COM100 digital headend system with COM24 blades
- Cabletronix DVMS Digital Video Management System
- Cabletronix CT-COM160 Satellite Switch
- Commercially standard rack mountable Ethernet switch
- Pro:Idiom encryption and license
- VPN Router (optional) for remote management and diagnostics

Below is a high-level block diagram of the Cabletronix COM1000 HD Headend Solution and how it is positioned within the entire signal distribution network:



DTVAH12DISH 1.2 meter

DTVMDUKAKU LNB Kit

StarRoute SR-SN5 Normalizer

Cabletronix HD Headend Solution

Pro:Idiom Television or Monitor

There are several key concepts that need to be understood as part of COM1000 system design, installation and configuration processes:

- QAMs are essentially a bridge between digital TV and an infrastructure that was built upon the allocation of 6 MHz RF channels dedicated to analog broadcast TV.

- QAMs enable a digital signal to be carried by RF on a TV channel, similar to the way an analog TV signal is carried by RF. Digital TV delivery permanently associates a QAM channel with a program stream, much like analog TV content is associated with a given channel frequency.

- The outputs of the content aggregation process at the head-end are digital Pro:idiom encrypted MPEG video streams, transported as IP over gigabit Ethernet. The IP switch directs the Pro:idiom encrypted MPEG signal over GigE streams to the appropriate GigE-enabled QAM, based upon assignment uploaded into the Digital Video Management System (DVMS). Each QAM is associated with a 6 MHz RF channel on the cable access plant. They enter the network via the head-end thru the Cabletronix DVMS edge QAM modulator.

- Programming a channel map into the flat panels will direct them to tune to the QAM channel where the requested content stream is located. Software in the Flat panel translates the QAM channel frequency number to the channel number displayed on the TV.

II. SYSTEM COMPONENTS AND DESCRIPTIONS

THOMSON COM100 DIGITAL HEADEND

The Thomson **COM100** digital headend is designed and manufactured by Thomson in accordance with DIRECTV® specifications. The COM100 consists of a rack mountable chassis with DIRECTV COM24 blades. Any number from 1 to 12 COM24 blades can be installed in a single chassis. Given each COM24 blade supports 2 tuners, a single COM100 is a high-density headend delivering HD content on up to 24 channels. Each COM24 card corresponds to a slot ID indicated on the front of the COM100 chassis.

The COM 100 chassis includes the following features:

- Enclosure and backplane for power distribution
- Redundant power supplies
- Redundant fans to ensure cooling
- Support of “hot swappable” COM24 blades
- Integrated Web interface for system provisioning and support
- Mountable in a standard 19” EIA rack
- 4 RU including 1 RU for airflow

A fully configured COM100 chassis with 12 COM24s operating with redundant power supplies draws approximately 320 watts at system startup. During steady state operation the approximate draw is 308 watts.

The **COM24** receives and tunes the DIRECTV RF stream via a SIM card. Each COM24 supports 2 MPEG2-HD or MPEG4-HD video streams. In addition, each COM24 removes DIRECTV’s encryption and applies the **Pro:Idiom encryption** for digital content protection. The COM24 outputs IP video in UDP or RTP formats. All COM24 software is remotely upgradable.

Additional COM24 blades can be added to an existing COM100 chassis at any time. Faulty COM24 units can be hot swapped for quick in-field servicing.

Note 1 CAM card supports the two tuners for each COM24.

Control and management functions (configuration, alarm and event captures, software updates) are done via a Fast Ethernet port. COM24 card commands include:

- Reset – reset individual cards or all cards simultaneously
- File Transfer – upload and download software updates
- Transfer Log File – upload a log-file to the host system
- Channel Search – search for channels based on object IDs used for system configuration

- Channel Tune – tune to a specific channel as directed by the host system
- Get Channel Status – means for the host system to resynchronize with the COM24 cards in the event that the host changes or becomes unavailable for a period of time
- Get System Info – COM24 provides information on itself

Note the COM24 only works with DIRECTV input signals in the range of 950 to 2150 MHz and does not support SWiM (Single-Wire Multi-switch) inputs.

All content output from the COM24 is encrypted with Pro:Idiom digital rights management and is compatible with Pro:Idiom enabled televisions and set-top boxes. However, some Pro:Idiom enabled televisions only support MPEG2 video compression. While the COM24 will pass along both MPEG2 and MPEG4 video streams, the COM24 does not transcode MPEG4 into MPEG2 streams.

Always make sure your COM1000 system is using the latest software versions. It is critical that your COM24s have the latest software version from Thomson and the DVMS has the latest software version from NACE.

CABLETRONIX DVMS DIGITAL VIDEO MANAGEMENT SYSTEM

The Cabletronix DVMS consists of two components:

- CT-QAM-DVMS QAM modulator
- Digital Video Management System Software for system management, equipment configuration, setting channel lineups, alert and event management, etc.

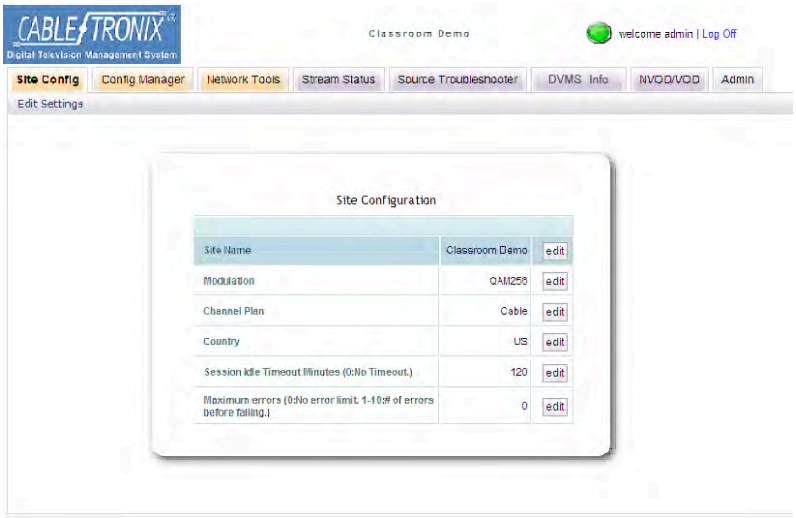
The **CT-QAM-DVMS** QAM modulator can be ordered in any one of multiple configurations. Examples include (a) CT-2QAM-DVMS supports 2 QAMs at 38.8 mbps per QAM, (b) CT-4QAM-DVMS for 4 QAMs at 38.8 mbps per QAM, (c) CT-6QAM-DVMS for 6 QAMs at 38.8 mbps (d) CT-8QAM-DVMS for 8 QAMs at 38.8 mbps per QAM and (e) CT-12QAM-DVMS for 12 QAMS at 38.8 mbps per QAM. The CT-QAM-DVMS accepts Pro:Idiom encrypted MPEG2-HD and MPEG4-HD streams from the Thomson COM100/COM24 blades via Ethernet, multiplexes, and modulates over adjacent QAM256 channels in 6MHz bandwidths.

The CT-QAM-DVMS is in a 1U rack mountable chassis for standard 19" EIA racks. It employs a solid-state operating system and is powered via a standard 120VAC outlet. The modulator uses a headend and distribution system's existing digital-ready coax wiring for the QAM RF output and are stackable to handle large channel lineups.

When selecting a CT-QAM-DVMS it is important to calculate bandwidth requirements for the HD channels. Note DIRECTV® recommends no more than 2 HD channels per QAM. This limitation is to ensure sufficient bandwidth per QAM. The table below provides a representative sample of QAM speeds for various HD content:

CHANNEL	SPEED
Sports	16 Mbps
Local	14 Mbps
News	12 Mbps
Movie	16 Mbps

The **Digital Video Management System Software** is an advanced management application for configuring channel lineups, automating failure recovery, activating a standby channel and providing remote, web-based administration. This software is provisioned via a standard Microsoft Windows-based PC with a web browser and an Ethernet connection to the CT-QAM-DVMS.



Always make sure your COM1000 system is using the latest software versions. It is critical that your COM24s have the latest software version from Thomson and the DVMS has the latest software version from NACE.

CABLETRONIX CT-COM160 SATELLITE MULTISWITCH

The CT-COM160 is a 6 input, 16 output satellite multiswitch primarily designed to provide signal to up to 16 satellite tuners from DIRECTV 99°,101°,103°,110°,119°,72.5° and 95° satellite positions. The unit is housed in a 19” rack mountable chassis with all of the input, output and power connections located on the rear making it perfect for use in headend systems. The standard The CT-COM160 has integrated B-Band converter technology that is perfect for applications in which all receivers are HD MPEG2-HD or MPEG4-HD and would normally require B-Band converters. This eliminates the need for individual B-Band converters on each receiver.

Key features and specifications include:

- 6 inputs to support DIRECTV 99°,101°,103°,110°,119°,72.5° and 95° Ka/Ku satellite positions
- 16 independent outputs
- Is 2RU high and mountable in a standard 19” EIA rack.
- Includes power supply with a coaxial lead.

COMMERCIALLY STANDARD RACK MOUNTABLE ETHERNET SWITCH

The 3COM® Baseline Switch 2126-G or equivalent is used as an "aggregator switch" providing Ethernet connectivity between each COM100/COM24 blade and the Cabletronix CT-QAM-RJ45 QAM modulator. This is an unmanaged, fixed configuration Layer 2 switch with 24 10/100 Ethernet ports and 2 copper 10/100/1000 uplinks. The Baseline Switch 2126-G comes pre-configured for fast, easy installation. Auto-negotiation adjusts the port speed to match the COM24 blades and CT-QAM-RJ45 QAM modulator. All 26 ports come with automatic detection of the Ethernet cable type (MDI/MDIX) to simplify cable connections. The unit is 1RU high and is mountable in a standard 19" EIA rack.

III. HARDWARE INSTALLATION AND CONFIGURATION

SAFETY AND RELIABILITY INSTRUCTIONS

Prior installing any of the system components it is critical the following instructions be followed:

a. Always use the best quality cable and connectors. Ensure all connectors are properly attached cable and connected to the equipment in question.

b. Prior to installing any equipment inspect the front and rear of the equipment for shipping damage. Make sure the equipment is clean, and no connectors are broken, damaged, or loose. If equipment appears to be damaged or defective please contact us at 1-610-429-1511 for assistance.

c. System installer must adhere to Article 820-40 of the NEC that provides guidelines for proper grounding and specifies that the cable ground shall be connected to *the grounding system of the building*, as close to the point of cable entry as practical.

d. As you are installing electrical equipment do not expose any component to rain or moisture. Do not open the unit's housing. Refer all servicing to qualified personnel only.

e. If installing any of the components in a closed or multi-unit rack assembly, the operating temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer.

f. Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised. The use of additional fans is highly recommended.

g. To ensure proper cooling of the Thomson COM100's COM24 blades do not operate the COM100 unless both cooling fans are in good operating condition with unrestricted airflow. All card slots must be filled either with a COM24 blade with faceplate attached or the blank faceplates supplied with the COM100 installed in that slot. The COM100's top cover must be installed for proper operation.

h. The mounting of equipment in the rack should be done to avoid a hazardous condition due to uneven mechanical loading.

i. Avoid AC circuit overloading. Consideration should be given to the connection of the equipment to the AC mains supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring. Ensure AC power outlets and circuits are more than sufficient to address the total power ratings indicated on the nameplates for ALL equipment to be used and powered.

j. AC mains drop out and surge protection is required. A suitable Uninterruptible Power Supply (UPS) and AC line surge protection device on the AC mains supply to the equipment rack are to be used.

k. A reliable earth ground of rack mounted equipment is to be maintained. Particular attention should be given to provide connections other than direct connections to the branch circuit (e.g. use of power strips).

l. All power supply cords are to be disconnected before servicing any electrical component. Note the Thomson COM100 has redundant power supplies and two power supply cords. Both cords need to be disconnected.

m. All Ethernet ports on the Thomson COM100 and COM24, Cabletronix CT-QAM-DVMS and Ethernet switch are for data communications among system components only and are not to be used for telecommunications purposes.

n. The equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used properly, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

KEY INSTALLATION CONSIDERATIONS

a. The optimum RF input tuner levels for the COM24 are between -25 to -55 dBm per transponder. Recommended RF signal levels must be balanced with special care to not to overdrive the CT-COM160 satellite multiswitch.

b. Normal operational behavior of the COM100 chassis is achieved with ambient temperatures of 95°F or less. Given heat is often the primary cause of electronic equipment failure it is recommended the installation environment have an ambient temperature well below 95°F.

c. Airflow to and from the COM100 front and rear air passageways cannot be obstructed.

d. Video will not be displayed until the COM24s have been authorized by DIRECTV.

DISH LNB TO CT-COM160 CONNECTIONS

DTVAH12DISH 1.2 meter

DTVMDUKAKU LNB Kit

StarRoute SR-SN5 Normalizer

① ② ③ ④ ⑤ ⑥ ⑦

⑧

1	**Power Port**	Port for CT-COM160 Power /Supply
2	**95 Input Port**	Satellite input port for the 95ºW satellite
3	**72.5 Input Port**	Satellite input port for the 72.5ºW satellite
4	**13V – 22K Input Port**	Connection to Slim Line Ka/Ku LNB for 130º/110º/119º satellites
5	**18V – 22K Input Port**	Connection to Slim Line Ka/Ku LNB for 130º/110º/119º satellites
6	**13V 99/101 Input Port**	Connection to Slim Line Ka/Ku LNB for 99º/101º satellites
7	**18V 99/101 Input Port**	Connection to Slim Line Ka/Ku LNB for 99º/101º satellites
8	**Output Ports to COM24 Satellite Blades**	Connections for up to 16 satellite receivers

a. The CT-COM160 is optimized for Slim Line Ka/Ku LNB supporting automatic switching for 99°, 101°, 103°, 110° and 119° W satellite positions.

b. Connect a 75ohm coaxial cable with F-connectors from each Slim Line Ka/Ku LNB Output to each of the CT-COM160's LNB Input ports (18V, 13V, 18V – 22K and 13V – 22K).

c. ***The 95 and 72.5 Input Ports can only be accessed with an Advanced Program Guide (APG) satellite receiver or a MPEG-4 capable HD receiver***. These ports are used to interface with the dish antennas of two additional DIRECTV satellites at 72.5°W and 95°W. ***The 95 and 72.5 Input Ports cannot be used for any off-air signal, CATV signal or security camera signal***.

d. With the APG satellite receiver, if you have either 72.5°W or 95°W inputs, always use the appropriate 72.5 or 95 Input Port. In a multi-APG IRD environment, you should run one auto-configure at a time; and before auto-configuring is running make sure the other APG IRDs are on 101°W (Channel 100 is suggested). This will reduce system acquisition time and minimize error.

e. Connect the power supply's F-male plug to the CT-COM160's Power Input port. Plug the power supply into a 120 VAC, 60Hz receptacle***. You must use the power supply provided with the CT-COM160***. ***Do not apply power.***

f. Since the Ka low band occupies a frequency range of 250-750 MHz, off-air antenna and cable signals cannot be diplexed through this unit or on the outputs of this unit when it is supplied with a signal from a Ka/Ku satellite dish.

g. ***Do not put terminators on any unused input or output ports of this switch***.

It is recommended to use the StarRoute SR-SN5 Normalizer within the property's RF plant prior to the CT-COM160 in order to normalize the B-Band Ka signals within the traditional Ku satellite signal levels. B-Band signals are generally higher powered and tend to cause the B-Band converters to saturate unless the installer is very careful regarding input signal levels going into the CT0-COM160. The ideal location of the StarRoute SR-SN5 is between the DIRECTV ODU Dish and the LNB Power Inserter (NAS PI-6S or StarRoute SR-6SPI)

The StarRoute SR-SN5 Normalizer is strongly recommended to aid in the "equalization" of the RF spectrum between 250 MHz and 2150 MHz. The SR-SN5 is an approved component for the COM1000 system. The NAS PI-6S LNB Power Inserter is an approved component for the COM1000 system.

CT-COM160 TO COM100 / COM24 CONNECTIONS

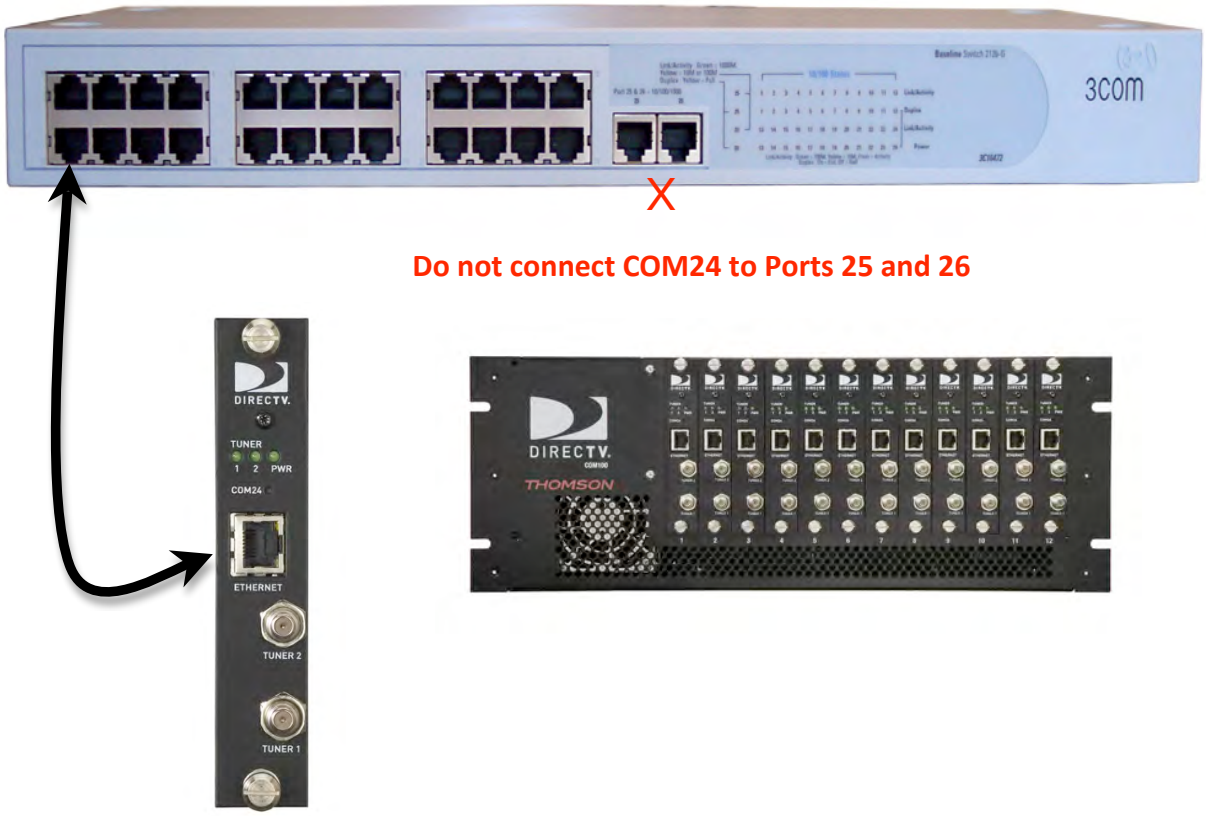
a. The CT-COM160 provides 16 identical satellite outputs.

b. For each satellite output from the CT-COM160 satellite switch connect an RG6 coaxial cable with two F-connectors to the Tuner input on the COM100's COM24 blades.

c. Repeat cable connections as necessary for your specific system configuration.

d. Note each COM24 blade supports two tuners and two inputs.

COM100 / COM24 TO ETHERNET SWITCH CONNECTIONS



a. Use a CAT5e or higher rated straight-through jumper cable with RJ45 connectors on both ends for each COM24 blade.

b. Connect one end of the jumper to the COM24's Ethernet port.

c. Connect the other end of the jumper cable to one of the Ethernet Switch's 24 ports. Do not connect the jumper to either Port 25 or 26 as these are reserved for connecting the switch to the CT-QAM-RJ45 QAM modulator.

d. Repeat connections for each COM24 blade in your system configuration.

e. Connect the Ethernet Switch to an AC power source.

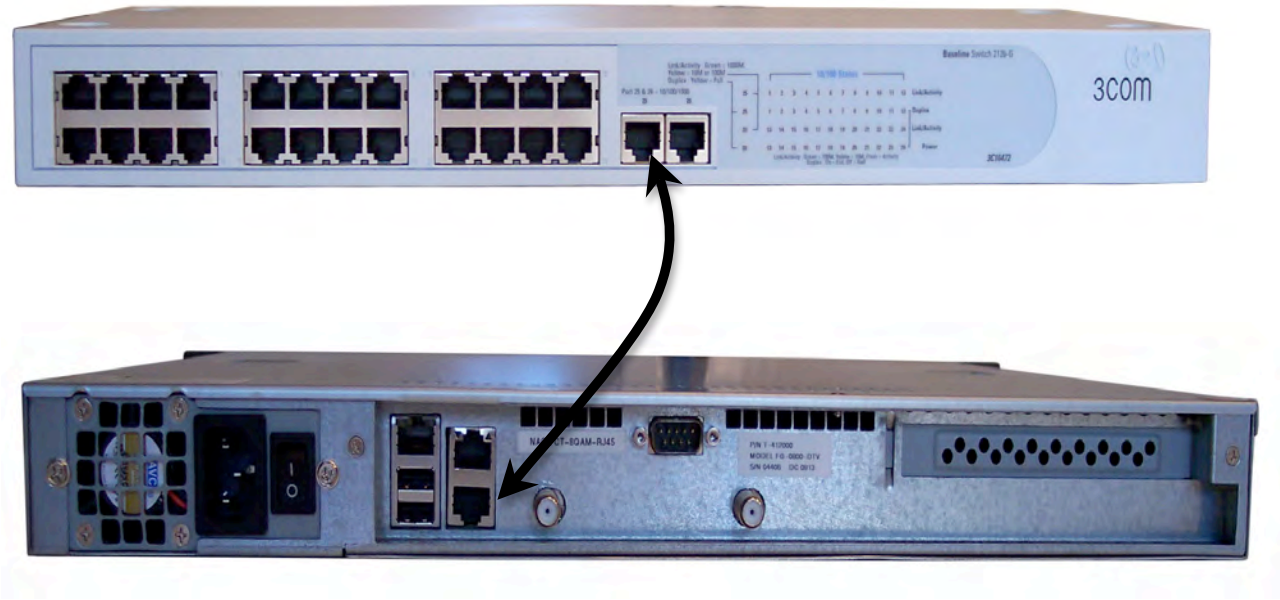
f. Connect the COM100 to an AC power source. Note since the COM100 uses redundant power supplies both AC connections should be made to the power source. ***Do apply power up the COM100 at this time***.

The Ethernet jack on the COM24 card contains two LEDs: one that indicates whether or not the link is connected to a port on the Ethernet switch and the other indicating that video is flowing from the card. The **link indicator** should always be steady green under normal operation.

The **activity indicator** should be quickly flashing green/amber at a high duty rate (multiple times per second) under normal operation. This indicates the COM24 blade is streaming video. If the activity indicator is dark or only slowly flashing but the link light is on, then the blade is not transferring video data. If the Tuner LED's are locked, then the COM24 blade should be reset. Resetting the blade can be done via the front panel reset button, or under software control via the s/w management tool.

The system's Ethernet switch will typically have its own set of indicators. These indicators can be cross-referenced with the indicators on the COM24. It may be useful to try different ports on the system's Ethernet switch for troubleshooting.

ETHERNET SWITCH TO CT-QAM-RJ45 QAM MODULATOR CONNECTIONS



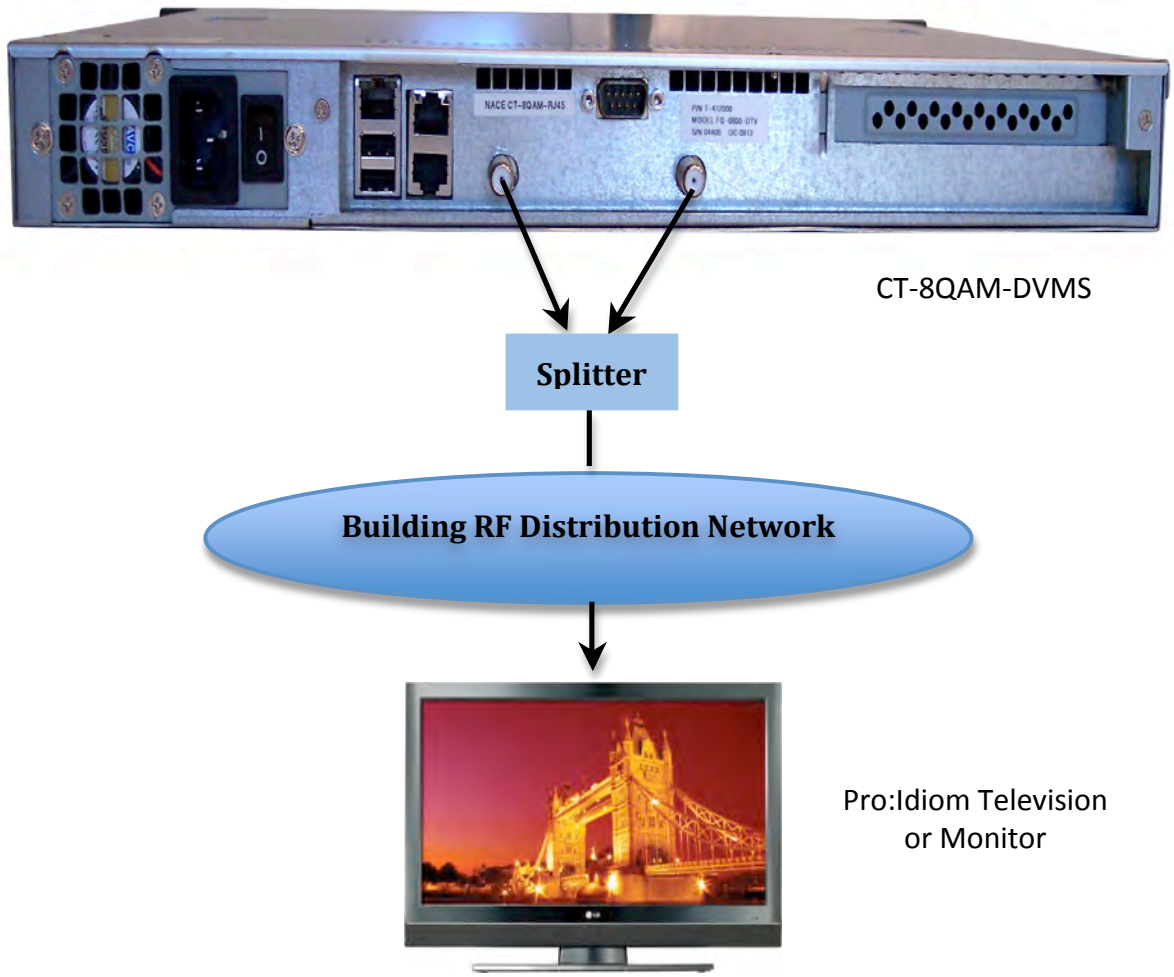
a. Use a CAT5e or better jumper with RJ45 connectors on both ends.

b. Connect one end of the jumper to either Port 25 or Port 26 on the Ethernet Switch.

c. Connect the other end of the jumper to the CT-QAM-DVMS' Ethernet port.

d. Connect the CT-QAM-DVMS' QAM modulator to an AC power outlet. ***Do not power on the CT-QAM-DVMS at this time.***

CT-QAM-DVMS TO DISTRIBUTION NETWORK CONNECTION



a. Use two RG6 coaxial jumpers with an F-connector on each end.

b. Connect one end of each jumper to each of the CT-QAM-DVMS' RF output ports. Note there is one RF output for up to every 4 QAMs. The CT-2QAM-DVMS and CT-4QAM-DVMS have only one RF output. The CT-6QAM-DVMS and CT-8QAM-DVMS have two RF outputs. The CT-12QAM-DVMS has three RF outputs.

c. Connect the other end of each jumper to a splitter. Any 5 – 1000MHz splitter with sufficient number of inputs to match the CT-QAM-RJ45 RF outputs will do. For example, the Cabletronix CTGHS-3 has the three inputs needed to support the CT-12QAM-RJ45's three RF outputs.

d. Connect another RG6 jumper with F-connectors between the splitter and the building's RF distribution network.

e. Note the QAM modulated signal must be 8 dB below the analog signal. Use a high quality QAM signal level meter to take measurements.

POWER UP SYSTEM COMPONENTS

After installing all system components and making the connections described above you may begin powering up individual equipment. Be certain your AC power source can support the system's aggregate power requirements prior to powering up individual units.

Equipment powering is achieved by:

a. CT-COM160 – Connect the included power supply to an active AC power outlet. The unit then self powers.

b. CT-QAM-DVMS – Flip the power rocker switch on the back of the unit from OFF position (0) to ON (|). Then push the red power button on the front of the unit. ***Note: If you need to shut down the CT-QAM-DVMS you must do so via the DVMS software and NOT by turning off the CT-QAM-DVMS rocker switch (power switch).***

c. Ethernet Switch – Connect the Ethernet Switch to an active AC power outlet. The unit then self powers.

d. COM100 / COM24 – Connect the redundant power supplies via the two AC power cords to an active AC power outlet. The COM100 self powers. A fully configured COM100 with 12 COM24s operating with redundant power supplies draws approximately 320 watts at system startup. During steady state operation the approximate draw is 308 watts.

Always use an Uninterruptable Power Supply (UPS) to protect against brown outs and power surges. A COM1000 system reboot time can exceed 10 minutes.

CT-QAM-RJ45 QAM MODULATOR TO PC LAPTOP CONNECTION

In order to use the Cabletronix Digital Video Management System's (DVMS) advanced management software for channel lineup configuration and system management a laptop PC must have an Ethernet connection to the CT-QAM-RJ45 QAM modulator. That connection can be achieved by using a CAT5e jumper with an RJ45 connector on each end between the laptop's Ethernet port and the CT-QAM-RJ45's data port.

IV. DIRECTV AUTHORIZATION

All DIRECTV receivers require authorization from DIRECTV, including the COM24.

Each COM24 receiver in the COM100 is authorized individually. If purchased as an integrated system, the receiver ID and CAMID (i.e., access card #) are printed on the outside packaging of the COM100 box and on a "throw-in" sheet inside the packaging. Authorization of a COM24 receiver is identical to a set top box. Simply boot the system up, verify that the system has successfully collected guide and then call the provisioning information into the DIRECTV call center.

Under normal situations, the COM24 receivers in the COM100 system will never lose their authorization. Like a normal DIRECTV set top box, however, any receiver that is not connect to the DIRECTV satellite network for an extended period of time will lose its authorization.

The authorization state of the receiver is evaluated at the time a channel is tuned, therefore it will be necessary to retune the receiver once they've been hit.

All COM1000 activations must be set up as an L-Band account with DIRECTV®.

V. CREATING A CHANNEL LINEUP FILE

Using a channel worksheet it is necessary to create a headend channel lineup file to be uploaded to the CT-QAM-DVMS QAM modulator via the Cabletronix Digital Video Management System (DVMS) Software. The following procedure is for creating and saving that file. Section *VI: Configuring a Headend Channel Lineup* will describe how to upload the channel lineup file using the Cabletronix DVMS software.

a. Open up the "Notepad" application under Microsoft Windows.

b. In "Notepad" type a configuration file using the example below. Note the following:

- "turnaround channel inbound" is the DIRECTV input channel. In the example below turnaround channel inbound 202 is DIRECTV input channel 202.
- "outbound" is the QAM output channel. In the example below the outbound channel 14-1 means QAM channel #14 and sub-channel #1.
- Every channel brought in requires a line with a "turnaround channel input" and "outbound" channel.

```
<channels>
<turnaroundchannel inbound="202"  outbound="14-1" />
<turnaroundchannel inbound="206"  outbound="24-2" />
<turnaroundchannel inbound="209"  outbound="24-3" />
<turnaroundchannel inbound="269"  outbound="25-1" />
<turnaroundchannel inbound="276"  outbound="25-2" />
<turnaroundchannel inbound="501"  outbound="25-3" />
<channels>
```

c. Once you complete the configuration file it must be saved as an XML file. Do this as follows:

- Save as "**Save As**".
- In the Save As window where it asks for File Name give it a name.
- In the Save As window where it asks to Save As type in or select **.xml**.
- In the Save As window where it asks for encoding select **UTF-8**.
- Save to your desktop (recommended) or to a file.

VI. THE CABLETRONIX DVMS MANAGEMENT SYSTEM SOFTWARE

Always make sure your COM1000 system is using the latest software versions. It is critical that your COM24s have the latest software version from Thomson and the DVMS has the latest software version from NACE.

The **Digital Video Management System (DVMS) Software** is an advanced management application for configuring channel lineups, automating failure recovery, activating a standby channel and providing remote, web-based administration. This software is provisioned via a standard Microsoft Windows-based PC with an Ethernet connection to the CT-QAM-RJ45.

ACCESS DVMS SOFTWARE

Access to the DVMS Software is achieved through the following steps:

a. Connect your Microsoft Windows-based PC to the CT-QAM-DVMS QAM modulator using the Ethernet ports on both the PC and QAM modulator.

b. Under Windows open up a standard Internet browser (e.g., Internet Explorer, Mozilla, etc.).

c. In the browser's URL address bar enter the following IP address: **192.168.100.1** . Hit Enter / Return

d. Proceed through the various security notifications by selecting "Yes".

e. At the **Log In** page:

- User Name: **admin**
- Password: **admin**
- Click the **Click Here** button

f. The DVMS Software will then load.

g. After load completion the **Site Configuration** tab will be displayed on the screen.

DVMS SOFTWARE FUNCTIONS

The DVMS Software has eight major function screens displayed as tabs. Briefly those functions include:

a. **Site Configuration** – Allows the administrator to name the site, set the configuration plan name, channel plan, QAM modulation, session idle time out, country, and maximum errors. Currently only site name change QAM modulation session, and idle time out are changeable.

b. **Configuration Manager** – Allows the loading of new or previous channel lineups.

c. **Network Tools** – Used to reassign the CT-QAM-DVMS QAM modulator's IP addresses. Generally there should be no need for an installer or administrator to use this function.

d. **Stream Status** – Displays the video stream details for each stream per COM24 and Tuner.

e. **Source Troubleshooter** – Provides a detailed view of each COM24 blade and Tuner.

f. **DVMS Info** – Displays software version and status information. Allows the administrator to refresh, reboot or shutdown the CT-QAM-RJ45 QAM modulator.

g. **NVOD/VOD** – Currently not used.

h. **Admin** – Provides a variety of administrator functionality including service status, user management, network management, diagnostics, logs, system time and time synchronization, software version updating and software patch updating.

SITE CONFIGURATION

The Site Configuration tab is the first function to appear once you are logged into the DVMS Software. As mentioned earlier, Site Configuration allows you to name and set a number of configuration parameters including:

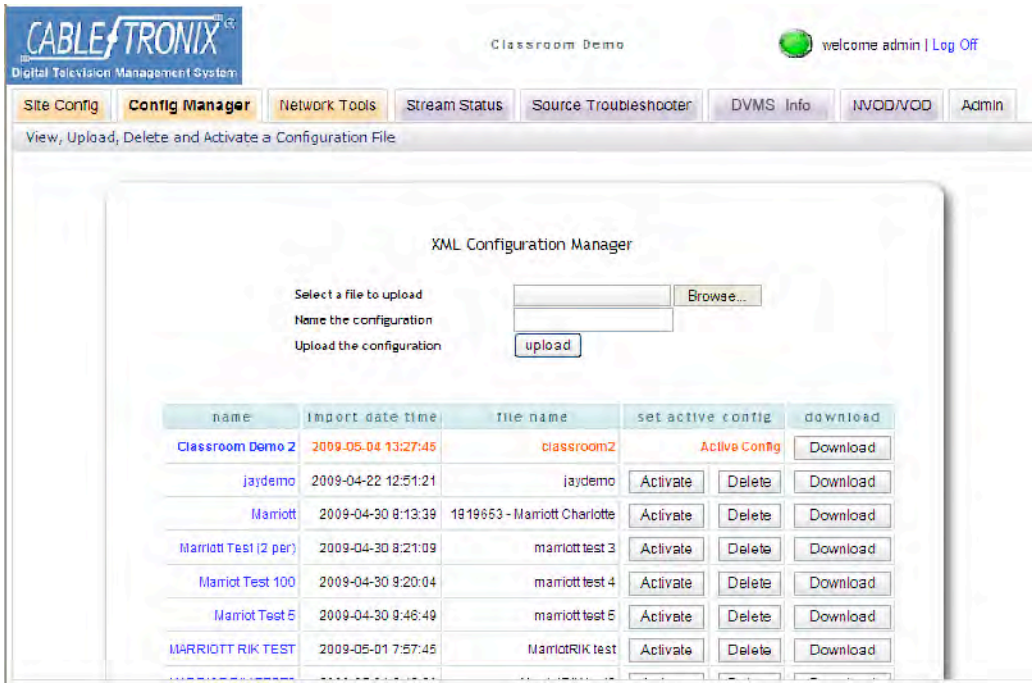
- Site Name – Assign a name to the site.
- Modulation – Option to choose between QAM256 or QAM64 modulations. The administrator should **ALWAYS select QAM256**.
- Channel Plan – Only option is **cable**.
- Country – Only option is **US**.

- Session Idle Timeout Minutes – Set the number of idle minutes before the system times out. Values are 0 (no timeout), 5, 10, 15, 20, 30, 60 and 120 minutes before timeout.
- Maximum Errors – Set the number of errors allowed to occur before the system goes into a failed state. Value are 0 (no error limit), 1 through 10 errors before failure occurs.

Note that if you are navigating these various parameters and want to change a setting the click on the **Submit** button. However, if no changes are to be made then click on the **Cancel** button.

CONFIGURATION MANAGER

The Configuration Manager is used to load new or previous channel lineups. A detailed description as how to define and load a channel lineup is provided below in section *V. Configuring A Headend Channel Lineup*.



NETWORK TOOLS

Network Tools is used to reassign the QAM modulator IP address. Generally there should be no need for an installer or administrator to use this function. Upon landing on the Network Tools page a "Network Interfaces" table will be displayed. This table provides the following information:

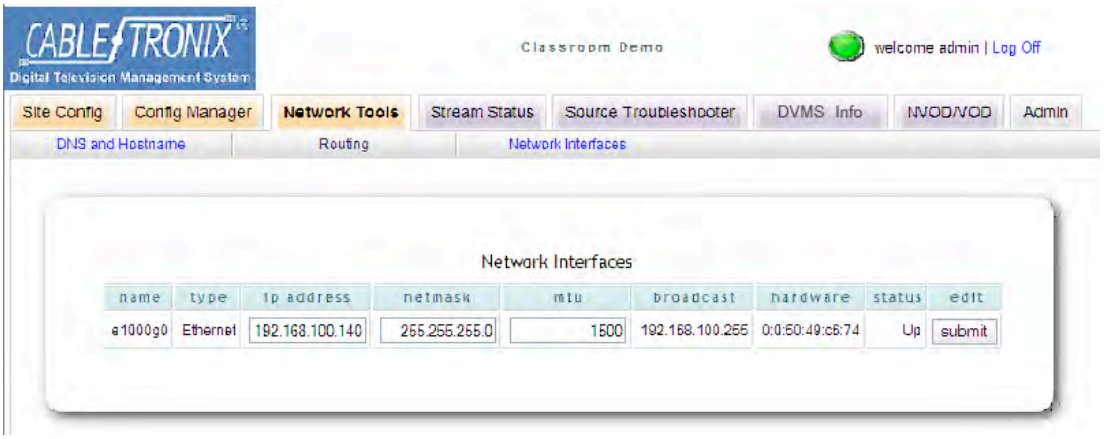
- Name – Refers to the Ethernet interface to external parties. Unlikely to be used in future releases.
- Type – Network type. This will almost always be Ethernet.
- IP Address – Current IP address being used. Note you may change the IP address in the window and click on the **Submit** button to change. However, doing so will affect network connectivity and should only be done once you are sure of why you need to change the IP address and how that will affect your configuration. ***Note: If using the optional VPN for remote diagnostics and management you need to ensure the IP address for the QAM modulator is permissible. It is suggested you consider 192.168.1.2 as the QAM modulator's IP address.***
- Netmask – Creates the subnet. This address can be changed via the window and clicking on the **Submit** button. However, doing so will affect network connectivity and should only be done once you are sure of why you need to change the address and how that will affect your configuration

- MTU – Maximum Transmission Unit refers to the packet size. Usually set to 1500. Note you may change the value in the window and click on the **Submit** button to change. However, doing so will affect network connectivity and should only be done once you are sure of why you need to make the change and how that will affect your configuration.
- Broadcast – The broadcast address is an IP address that allows information to be sent to all machines on a given subnet rather than a specific machine. Option to set the Broadcast IP to an "Automatic" setting is what you may want to select if you don't know the Broadcast IP for the network segment. Usually this is implied by the netmask, but it is possible to discretely set the broadcast address to something NOT implied.
- Hardware – CT-QAM-DVMS QAM modulator serial number.
- Status – Up indicates CT-QAM-DVMS QAM modulator is running.
- Edit – Submit button allows changes to be made to IP Address, Netmask and MTU addresses or values.

Network Tool also allows the administrator to make additional network settings via:

- DNS and Hostname Settings – Assign a name to the host and list DNS servers where appropriate. When done click the **Submit** button.
- Routing – Lists your default routers. If you elect to select a different router then click the **Save** button. The routing configuration will change when the system is rebooted.

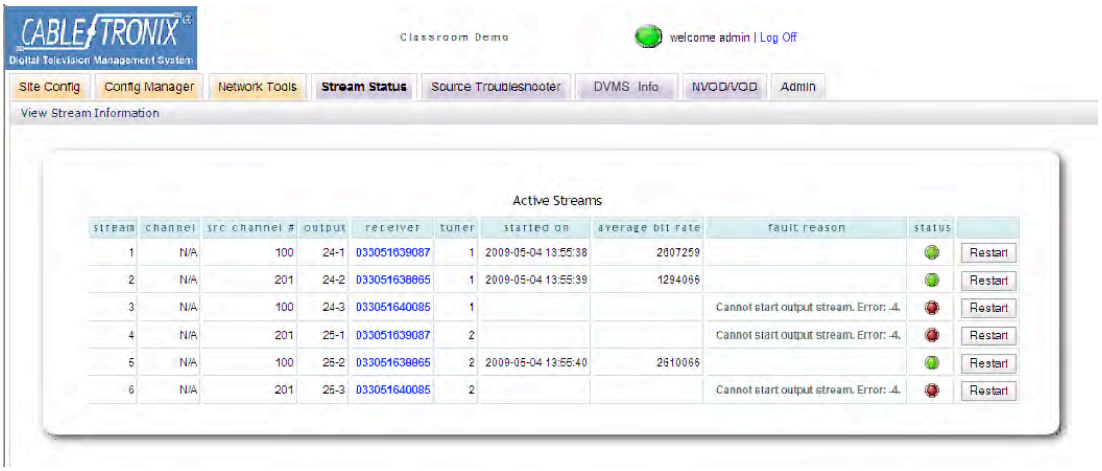
Note that if you are navigating the various setting options and decide NOT to make any changes then click on the browser's **Back** button to return to the previous page. Be aware that if you click **Submit** you may have to reboot the system.



STREAM STATUS

Stream Status shows the video stream details for each stream per COM24 and Tuner. The displayed table includes:

- Stream – Number of each stream beginning with 1 for the first stream
- Channel – Allows you to assign a name or label to a particular channel
- SRC – The DIRECTV input channel
- Output – The CT-QAM-RJ45 QAM modulator output channel
- Receiver – Serial number of the COM24 blade
- Tuner – Identifies which tuner (1 or 2) per COM24
- Started On – When the COM24 started taking signal input
- Average Bit Rate – Bit rate information associated with the incoming channel
- Fault Reason – In the event of a failure the nature of the failure will be displayed
- Status – Displays whether the COM24 / Tuner is in an active or fault state
- Restart – Clicking on the "Restart" button restarts the COM24 and tuners



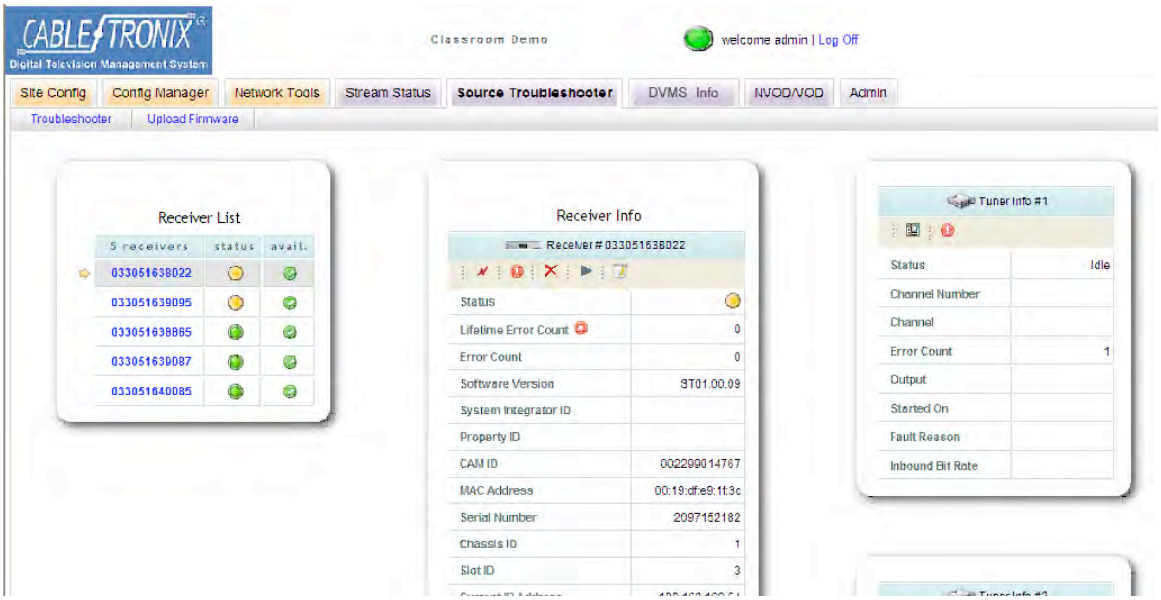
SOURCE TROUBLESHOOTER

The Source Troubleshooter provides a detailed view of each COM24 and Tuner. On the left side of the screen is a table titled "**Receiver List**". The Receiver List shows individual COM24s loaded in the COM100, the status of those receivers and whether the receivers

are available. The highlighted COM24 in the Receiver List provides detailed information in the “Receiver Information” table.

The **Receiver Information** table located in the center of the screen provides a wealth of data on the selected COM24. In addition, the administrator may enable or disable a receiver, reset a receiver, determine receiver availability, remove a receiver and perform additional software configuration functions.

On the right of the screen are two tables – “**Tuner Information 1**” and “**Tuner Information 2**”. These tables provide status information on each of the two tuners for the selected COM24. In addition the administrator can get updated Tuner status as well as make a Tuner available or unavailable.



DVMS INFO

In addition to providing software version, memory, CPU utilization, receiver network, boot date, uptime, serial number and other the administrator has three restart options:

- Refresh – Restarts the DVMS Software without shutting down the CT-QAM-DVMS QAM modulator.
- Reboot – Shuts down and restarts the DVMS Software and the CT-QAM-DVMS QAM modulator.
- Shutdown – Shutdown the DVMS Software and CT-QAM-DVMS QAM modulator.

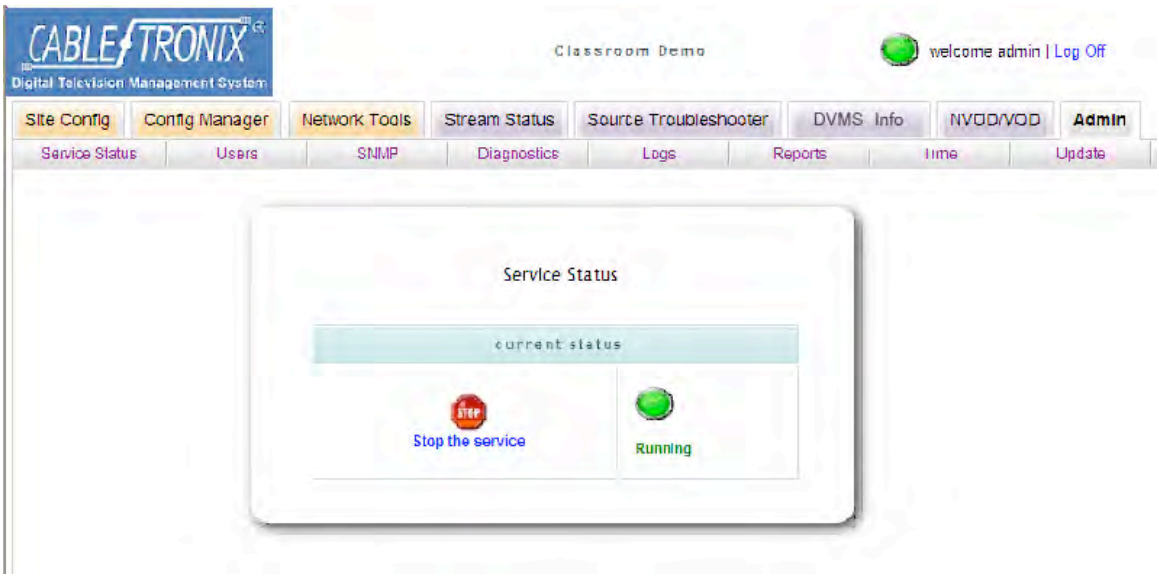
ADMIN

When landing on the Admin page the Service Status is displayed. In addition to Server Status the following administrative functions are provided:

- Service Status – Stop and Start services.
- Users – Create users, assign and change user rights, passwords, e-mail addresses, etc. for each user. To make changes click on the **Edit** button, make the change, then click on the **Update** button. If you elect not to make any changes then click on the **Cancel** button.
- SNMP – Simple Network Management Protocol function for network monitoring and management. Not available in the current version of DVMS.
- Diagnostics – Allows the administrator to flush receiver, that is, to remove the channel plan and other information from the CT-QAM-DVMS QAM modulator.
- Logs – Provides a list of log files that are clickable to display activity log data.
- Reports – PDF versions of some of the logs plus the STB Report. The STB Report is a PDF report of all receivers attached to the system. It displays information

useful in getting receivers authorized. It also displays the comments section from each receiver that is useful in keeping track of blades and receivers.

- Time – Set and display system time and date as well as time server synchronization.
- Update – Stops services and allows updating of new software version.
- Patch – Stops services and uploads software patch. Find patch file by clicking on the **Browse** button that then displays list of files on your PC, desktop, etc. Select the appropriate file then click **Open** in the file window. Then click **Upload** in the Update Patch window.



VIII. CONFIGURING A HEADEND CHANNEL LINEUP

The following procedure is for configuring the channel lineup between the COM100 / COM24 and the CT-QAM-DVMS QAM modulator. **Note this is a headend channel lineup**. For a logical channel lineup – one that maps the lineup from the headend to what is displayed on a Pro:Idiom television – the installer will need a separate third party application.

This procedure uses the .xml channel lineup file you created and saved under Section *IV: Creating a Channel Lineup File*.

a. Go to the DVMS Software and log in.

b. Select the **Configuration Manager** tab.

c. Click on **Browse** and select the configuration file you just created and saved.

d. In the dialog box select the file and click **Open**.

e. Upon clicking **Open** the file name will automatically fill in the **Select a file to upload** field in the Configuration Manager.

f. In the **Name the configuration** field in the Configuration Manager assign a name. It is recommended to use the property site name (e.g. Lucky Pines Resort).

g. Click the **Upload** button. This uploads the saved .xml configuration file to the QAM modulator.

h. Click the **Back** button.

i. Click the **Activate** button.

j. Select the **DVMS Info** tab.

k. Under DVMS Info click **Reboot**. Both the DVMS Software and CT-QAM-DVMS QAM modulator will shutdown and be brought back online with the new channel lineup installed.

IMPORTANT – If a channel is not authorized and you ask DIRECTV® for a hit the channel may not come up. If this happens you must to a STOP then START under the DVMS software ADMIN tab. Note this may take up to 10 minutes.

IX. DVMS SOFTWARE UPDATING and COM24 FIRMWARE UPDATING THROUGH DVMS

Follow the steps below to update the DVMS software and/or the COM24 receiver firmware through the DVMS. Updates will require:

- Laptop or PC to access the DVMS
- Ethernet connection from Laptop or PC to the DVMS
- DVMS / COM24 update files from www.northamericancable.com/updates
    - Updates beginning with **VPIWfloodgate** are new DVMS software versions
    - Updates beginning with **VPIWfg** are DVMS software patches
    - Updates with **image*******.bin** are COM24 firmware updates

Thoroughly read and review the following steps BEFORE initiating any software or firmware updates. Contact NACE Technical Support should you have any questions.

1. Log onto www.northamericancable.com/updates to download and save the appropriate files. Be sure to save them in a place you will remember for a later step. Note certain files such as image*****.bin must be unzipped before they can be installed.
2. Log into the DVMS. After entering your username and password watch the load page. Beneath the progress bar the **DVMS software version** should be displayed. If it is lower than the version posted at www.northamericancable.com/updates the update must be performed. The software version may also be obtained in the **DVMS Info** tab.
3. If the DVMS is already running the latest version of software proceed to **Step 4**. To **update to a newer version of DVMS software** click on the "**Admin**" tab. Once the Admin screen loads a series of sub-tabs will open beneath the primary tabs. Click on "**Update**". A dialog box will load. You will need to click the "**Browse**" button and select the appropriate file – VPIWfloodgate_*.***_DTV.vpk – that you downloaded from www.northamericancable.com/updates and saved to your laptop or PC.

   Click "**Upload**" which will upload the software update to DVMS. After a few moments a new link opens with a "**Start Update**" button. Click the "**Start Update**" button. (Note: the DVMS service must be stopped to do the software updates to the DVMS. You will be prompted to stop the service prior to the update). A new window will open detailing the progress of the update. The DVMS software update process takes approximately 10 minutes to complete. Once the update is finished it will prompt you to reboot the DVMS and close the Internet browser (Note: DVMS reboots may require 6 to 10 minutes).
4. **If you are required to install a DVMS software patch** (not a full software version update) log back into the DVMS. You can check the software loading screen on the

"**DVMS Info**" tab to make sure your are now running the latest version of DVMS. If your DVMS software is not the latest version perform **Step 3**. If you are running the latest DVMS software version but need to install a software patch, go to the "**Admin**" tab and click on the "**Patch**" sub-tab. A screen similar to the "**Update**" will appear. Click on the "**Browse**" button and select the patch file – VPIWfg******.vpk – that you downloaded from www.northamericancable.com/updates and saved to your laptop or PC. After a few moments a new link will open with a "**Start Patch**" button. Click the "**Start Patch**" button. A new window will open detailing the progress of the patch. Once the patch is complete the new window will prompt you to close the window. Do so. Reboot the DVMS through the "**DVMS Info**" tab.

5. **To update the COM24 firmware** log back into the DMVS.

   a. Click on the "**Source Troubleshooter**" tab. Sub-tabs will open beneath the primary tabs. Click on the "**Upload Firmware**" tab. A similar screen the previous steps opens. Click on the "**Browse**" button and locate the firmware file – image*******.bin – that you downloaded from www.northamericancable.com/updates and saved to your laptop or PC. Click the "**Upload**" button. A window will open starting the file upload process.

   b. Click on the "**Troubleshooter**" sub-tab. Click on a receiver in the "**Receiver List**" box. Move to the "**Receiver Info**" box. To begin the firmware update on a card, it must first be made unavailable. This is done by clicking the **red circle with an exclamation point** on it. It will then change to a **green circle with a check mark** on it and its availability will displayed in the "Receiver List" box (Note: The button is located between the "Reset" or lightning bolt, and the "Delete Receiver" or the "X" button). Next you must enable the firmware update. This is done by clicking the **blue triangle** in the same "Receiver Info" box. You will be prompted to start the update. Click "**OK**". It will change to a **red square** (Note: Watch the COM24 card you selected. The update begins immediately. The tuner and power lights will go through a series of rapid flashes during the update. Once the update is complete, the COM24 receiver will then go through its reboot process. From the start of the update to the end of the reboot, the process takes roughly 7 minutes per card. **DO NOT power down the card during this process as it may become inoperable**). Repeat **Step 5b** for each card in your "Receiver List".

   c. Once all receivers have been updated and then rebooted themselves they must be made available again to receive streams. Start by selecting the receiver from the "**Receiver List**" box. Move to the "**Receiver Info**" box. Click on the **red square** to disable the firmware update. It will then change back to the **blue triangle**. Next, click on the **green circle with a check mark** on it. It will then change back to the **red circle with an exclamation point** on it. Its availability will be displayed in the "**Receiver List**" box. Repeat **Step 5c** for each card in the "**Receiver List**".

X. REMOTE MANAGEMENT & DIAGNOSTICS WITH OPTIONAL VPN ROUTER

Given the complexity of the COM1000 it is highly recommended the optional VPN router be installed as part of any COM1000 system. This option will allow NACE and any other authorized third party to perform remote diagnostics and system management thereby reducing down time, service calls and field engineering expense.

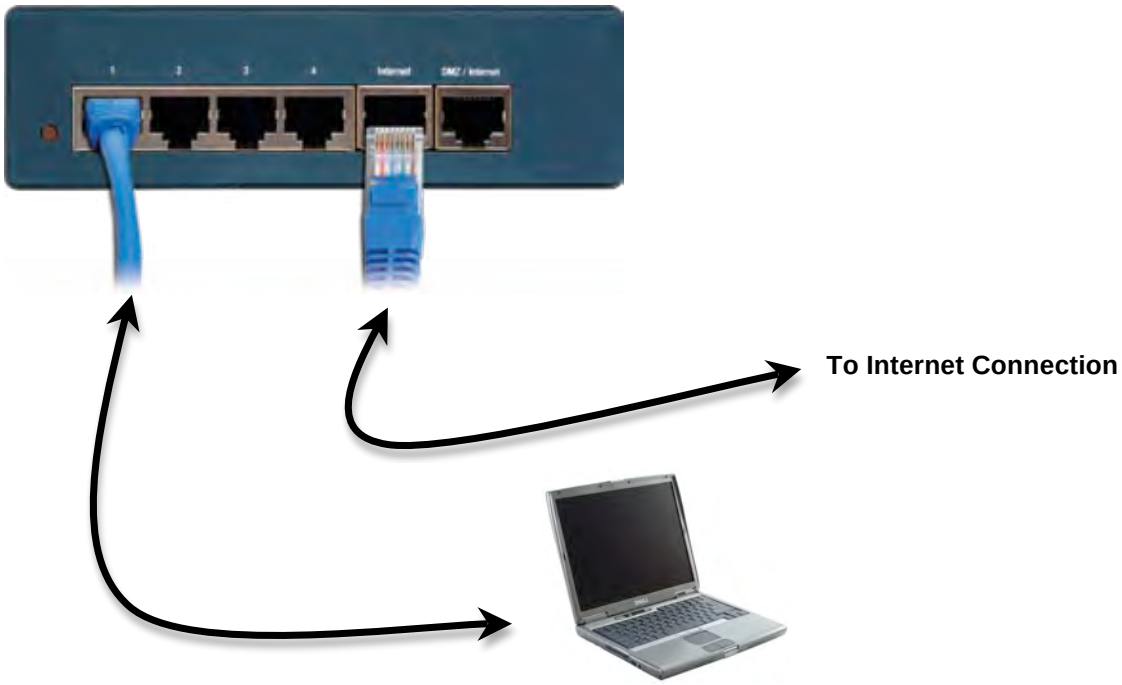
NACE recommends using the Linksys® RV042 4-Port VPN Router. Although alternative VPN Routers are available on the market, NACE has tested the RV042 in its labs and various COM1000 configurations.

INSTALLING THE RV042

Note in this instance a VPN is a temporary, point-to-point tunnel between a remote workstation or PC and the COM1000. This communication link allows remote access to the CT-QAM-RJ45 QAM modulator and the DVMS software. The following steps are recommended guidelines, yet one should recognize specific installations and configurations may vary depending upon network considerations at the COM1000 site.

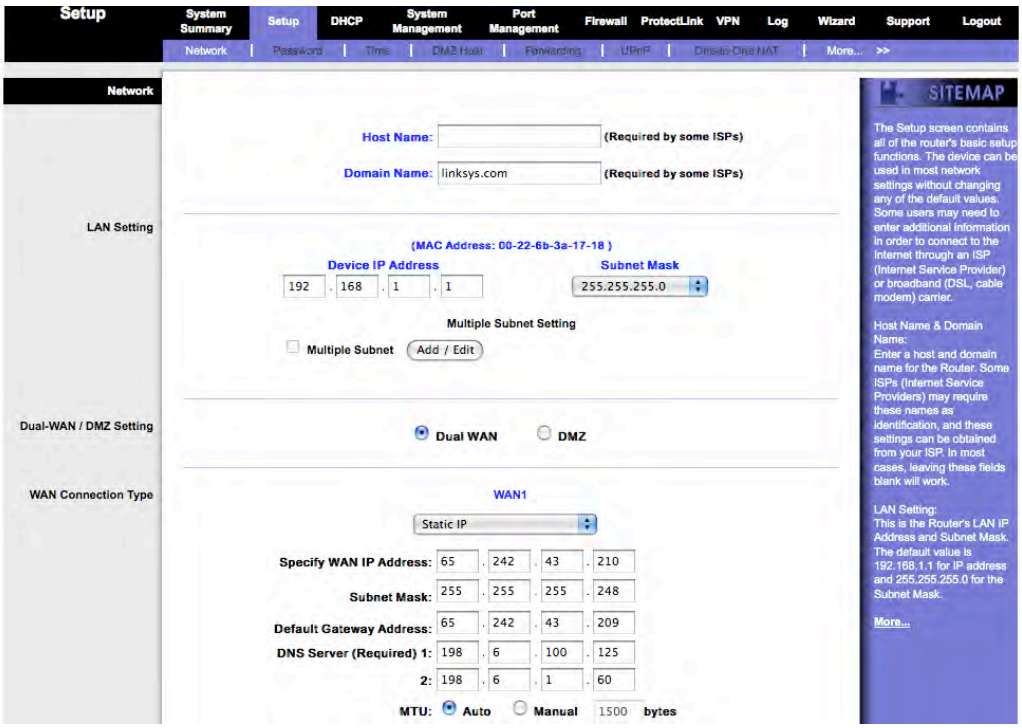
Follow the steps below to install and establish connectivity with the RV042:

1. Contact the property. You will need the property's IT department or ISP to provide the following:
    a. A static IP address, subnet mask, gateway address and DNS address
    b. Access through the property's firewall for this IP address
    c. Access to the Internet via DSL, cable modem or other device
2. You will also need the IP address assigned to the CT-QAM-RJ45 DVMS system (e.g., 192.168.1.2).
3. Connect the Internet device (cable modem, DSL modem or direct Internet connection) to the "**Internet**" port on the back of the RV042.



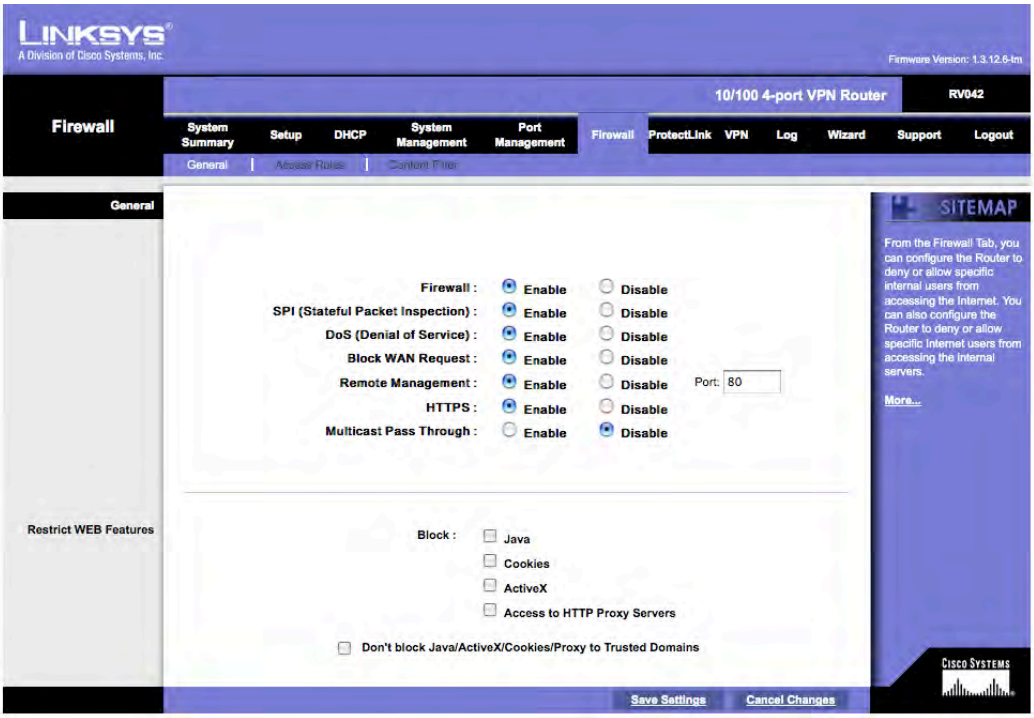
4. Connect your **laptop** to one of the RV042's **ports 1-4**.
5. Power on the RV042 and navigate in a web browser to http://192.168.1.1
6. The default Username is **admin** and Password is **admin**.
7. Next change the password for the login. Click the **"Setup"** tab and the **"Password"** sub-tab. The old password is **admin**. Enter in the new password as **vpn** the click "Save Settings". You will have to login again with the new password.

8. While on the **"Setup"** main tab, click on the **"Network"** sub-tab. Scroll down to WAN1 and use the drop down menu to select "Static IP".



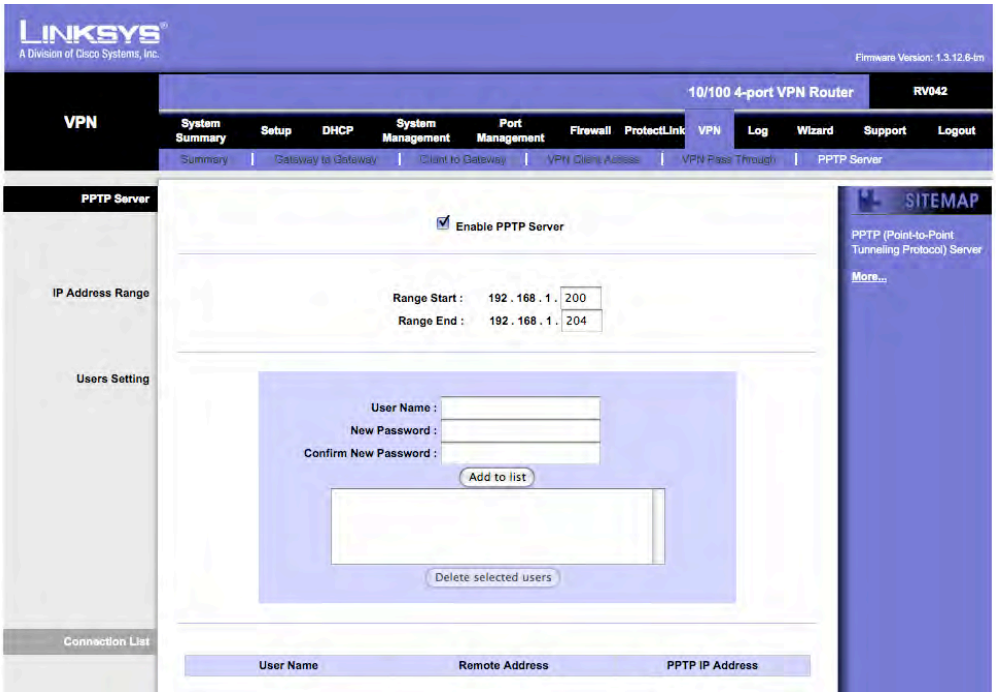
9. Fill the IP settings with the information from the ISP and click **"Save Settings"**.

10. Next click the **"Firewall"** tab and enable **"Remote Management".** Then click **"Save Settings".**



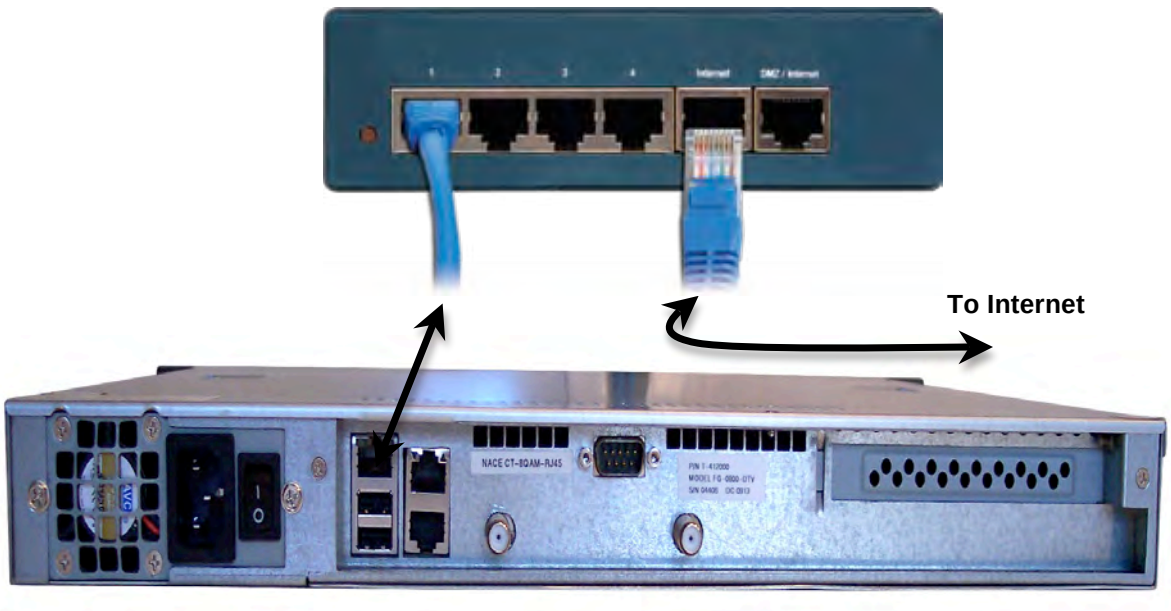
11. Go to the **"VPN"** tab and click on the **"PPTP"** sub-tab. In the PPTP window do the following:

    a. Enable PPTP
    b. Create and enter a User Name. It is recommended the User Name be specific to the COM1000 site.
    c. Create and enter a Password. Then confirm the Password.
    d. Be sure to write down the User Name and Password. You will need this information plus the Static IP Address to create your VPN tunnel.
    e. Click on "Save Settings".



12. After configuring the RV042 then:

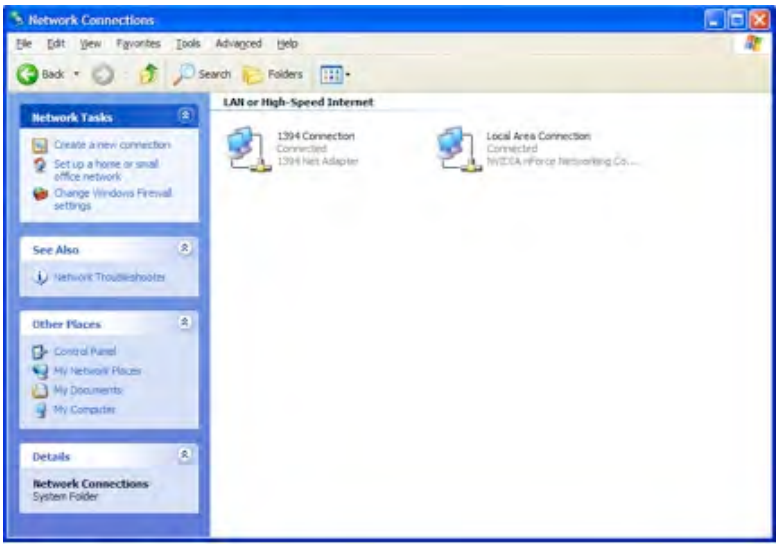
    a. Disconnect the laptop from the RV042
    b. Connect the RV042 using ports 1-4 to the CT-QAM-RJ45 rear Ethernet port



13. It is now necessary to configure your PC network connection for you to gain VPN access to the CT-QAM-RJ45 and DVMS through the RV042. It is assumed you are using a Microsoft Windows PC or laptop.

14. On your PC/laptop go to **"My Network Connections"**. Click and view all the network connections on that PC/laptop.

15. Click on **"Create a New Connection"**. A New Connection Wizard will appear to guide you with the new connection process. Click **"Next"** on the wizard.



16. In the **“Network Connection Type”** window select **“Connect to a Network At My Workplace”** and click **“Next”**.

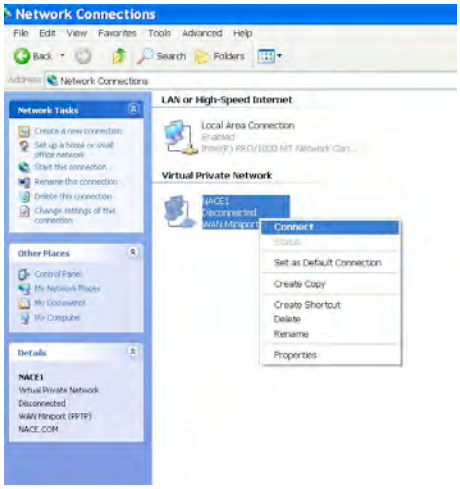
17. In the **“Network Connection”** window select **“Virtual Private Connection”** and click **“Next”**.

18. In the **“Connection Name”** window enter the User Name you assigned to the COM1000 site when configuring the RV042 under Step 10. Click **“Next”**.

19. In the **“VPN Server Selection”** window enter the Static IP Address (WAN IP Address) you entered into the RV042 under Step 7. Click **“Next”**.

20. Select **“Finish”**.

21. Your connection will now be saved in the Network Connections folder. Go to **Network Connections** and under **Virtual Private Network** you will see the VPN connection you just created (in this instance NACE1). Right click on the icon and select **"Connect"** from the menu.



22. You will now be presented with a **"Connection"** widow for logging into the VPN.

23. Enter the User Name you assigned under Step 10. Enter the Password you created under Step 10. Click **“Connect”**.

24. Open Internet Explorer and enter the IP Address assigned to the CT-QAM-RJ45 (e.g., 192.168.1.2)

25. You will now have a secure and virtual access to the QAM modulator and the DVMS system.

XI. PRO:IDIOM LICENSING

Prior to installing and activating any system using the Thomson COM100 / COM24 ***both the dealer and the property must sign Pro:Idiom licensing transcoder agreements*** as follows:

- One copy of the Thomson Pro:Idiom Transcoder License Agreement signed by the dealer purchasing and installing the system on the property.
- One copy of the Thomson Pro:Idiom Transcoder License Agreement signed by the property.
- One copy of the NACE Pro:Idiom Transcoder License Agreement signed by the dealer purchasing and installing the system on the property.
- One copy of the NACE Pro:Idiom Transcoder License Agreement signed by the property.

Original copies of those agreements must be provided to North American Cable Equipment, Inc, before the system is shipped and installed. Copies of those licensing agreements are found in Appendix A and Appendix B.

XII. NACE TECHNICAL SUPPORT

NACE provides technical support only for those components or complete COM1000 systems purchased from NACE. The following table details NACE's support fees for COM1000 components and complete systems.

Purchased	Support	Rates
Individual Components Only	1 hour of telephone and/or VPN support	Free
Un-racked System Components	Telephone or VPN support	$80 per hour billed in 15 minute increments at $20 per 15 minutes.
Racked Systems – No NACE Training	1 hour of telephone and/or VPN support	Free for 1st hour then $80 per hour billed in 15 minute increments at $20 per 15 minutes.
Racked Systems – NACE Training	3 hours of telephone and/or VPN support	Free for first 3hours then $80 per hour billed in 15 minute increments at $20 per 15 minutes.

APPENDIX A: THOMSON PRO:IDIOM TRANSCODER LICENSING AGREEMENT

PRO:IDIOM LICENSEE TRANSCODER LICENSE AGREEMENT

THIS PRO:IDIOM LICENSEE TRANSCODER LICENSE AGREEMENT (the "Agreement") is by and between Thomson Inc. (the "LICENSEE") and the undersigned (the "Recipient") made as of the _____day of _____, 20___.

Whereas the party signing below ("Recipient") has not executed a Pro:Idiom Content Protection System Agreement, or otherwise is not currently a Pro:Idiom Adopter, but desires to receive or buy Transcoders, Recipient hereby acknowledges and agrees as follows.

B.1 Definitions. Capitalized terms not otherwise defined herein have the definition set forth in Attachment 1.

B.2 Rights granted. Upon receiving Transcoders subject to this Agreement, Recipient shall have the rights to (i) use the Transcoders to receive Commercial Audiovisual Content transmitted to the public by a Multichannel Video Program Distribution System and to encrypt that content, and only that content, using Pro:Idiom in accordance with the Specification for transmissions to Pro:Idiom Licensed Products containing Pro:Idiom Sink Functions within the Hospitality Environment, (ii) subject to LICENSEE's right of first refusal, to sell, offer for sale, or distribute the Transcoders to Pro:Idiom Adopters, and (iii) subject to LICENSEE's right of first refusal, to transfer or distribute, or offer for transfer or distribution Transcoders to others that are not Pro:Idiom Adopters ("Transcoder Recipients"), on the condition that each such Transcoder Recipient executes this Agreement and provides an executed copy to LICENSEE at the address set forth below, and that such transfer is subject to the terms and conditions in this Agreement.

B.3 Limitations. The rights granted in section 2 above do not include the right to own and or operate standalone encryption equipment capable of encrypting pay per view content. The Recipient further acknowledges that this license only applies to the standalone operation of Transcoders and that the combination of Transcoder operation with any other Pro:Idiom system element, such as PPV encryption or tuning conducted over system provider interfaces, requires a full Pro:Idiom Content Protection System Provider Agreement.

B.4 Marking Requirement. Recipient shall configure Pro:Idiom Sink Function devices (e.g.,television sets that receive transmissions from Transcoders) with information that can be used to trace the source of a Pro:Idiom signal back to the individual Pro:Idiom Source function (Transcoder) prior to any use and maintain the accuracy of such configuration to reflect any future changes using a "stand alone" methodology supplied by a licensed Pro:Idiom Adopter.

B.5 No modification. Recipient shall not modify Transcoder, by hardware or software or otherwise, or alter its operations or function in any way.

B.6 No disclosure or reverse engineering. Transcoders include and embody confidential and proprietary information that is the property of Zenith, LICENSEE and/or their respective affiliates. Recipient shall neither reverse engineer the Transcoder, nor disclose any confidential or trade secret information embodied in the Transcoder to others.

B.7 Indemnification. Recipient shall, defend, indemnify and hold harmless Zenith, LICENSEE, their respective Affiliates and their respective officers, members, representatives, agents, directors, equivalent corporate officials, and employees from and against any and all damages, costs and expenses (including without limitation reasonable attorneys' fees and related expenses) to the extent arising from a third party legal claim against the foregoing based on (i) any breach of this Agreement, (ii) the use of Transcoders or Pro:Idiom by Recipient in any manner other than as expressly authorized by this Agreement, (iii) the use of Transcoders by Recipient in any manner contrary to any provision of applicable law (not including third party intellectual property rights where Recipient is otherwise in compliance with this Agreement and

the law), or (iv) the use of modifications, alterations, combinations or enhancements of Transcoders or Pro:Idiom by Recipient.

B.8 Renewal. Recipient acknowledges that in the event of a Pro:Idiom security breach, a renewal of the Pro:Idiom system may be required under conditions described Attachment 1 below. Such renewal may include Recipient's Transcoders and other devices containing a Pro:Idiom Sink Function (e.g., television sets that receive transmissions from Transcoders). In the event such renewal is required, Recipient acknowledges and accepts that some disruption in operation of its affected Transcoders is likely, and that Recipient will need to perform steps in the renewal process, as directed by Zenith, LICENSEE, a Pro:Idiom Adopter or a Multichannel Video Program Distribution System operator, in order to reactivate such Transcoders. Recipient hereby agrees to hold harmless Zenith, LICENSEE, Pro:Idiom Adopters, and, if instructions are received from a Multichannel Video Program Distribution System operator, such operator, from any disruption in operation of its Transcoders resulting from a renewal process initiated pursuant to the Pro:Idiom Content Protection System Agreement(s).

B.9 Notice. Recipient shall provide an executed copy of this Agreement to LICENSEE at the address below within ten days of execution. Facsimiles and electronic copies are acceptable provided they contain original signatures. An executed copy will be returned to the address listed below.

B.10 Effective Date. This Agreement is effective on the date LICENSEE receives an executed copy from Recipient.

Recipient	LICENSEE
	_____
Signature) _____	Robert Reiter
Name) _____	
Company) _____	Thomson Inc.
	101 W 103rd St
	Indianapolis, IN 46074
Address) _____	Fax: 1-317-587-6001
_____	
Phone/Email _____	

ATTACHMENT 1 TO PRO:IDIOM TRANSCODER LICENSE:

DEFINITIONS

"Affiliate" means, with respect to Zenith, LICENSEE or any other Pro:Idiom Adopter, any entity directly or indirectly (i) owned or controlled by Zenith, Licensee, or Pro:Idiom Adopter, respectively, (ii) owning or controlling Zenith, Licensee, or Pro:Idiom Adopter, respectively, or (iii) owned or controlled by Zenith, Licensee, or Pro:Idiom Adopter, respectively, at the relevant time (but only during the time such entity meets these requirements). For the purposes of this definition, an entity shall be deemed to own or control another entity if more than fifty percent (50%) of the voting stock or similar interest entitled to vote in the election of directors (or, if there is no such stock, more than fifty percent (50%) of the ownership of or control in the latter entity) of the latter entity is directly or indirectly held by the controlling entity.

"Commercial Audiovisual Content" means copyrighted works that consist of a series of related images that are intrinsically intended to be shown by the use of machines, or devices such as projectors, viewers or electronic equipment, together with accompanying sounds, if any, regardless of the nature of the material objects, such as films or tapes, in which the works are embodied, provided for performance by transmission through the system of a Pro:Idiom System Provider to the occupants of hotels, motels or other establishments in the Hospitality Environment, either generally or on demand.

"Copy Never" means the CCI status that indicates that audiovisual content labeled with this status shall never be copied.

"Copy One Generation" means the CCI status that indicates that audiovisual content labeled with this status may be copied but that such copy shall not be copied.

"Field of Use" means the use of Pro:Idiom in the Hospitality Environment in accordance with the Specification and the Compliance Rules (as set forth in a Pro:Idiom Agreement) to encrypt and decrypt Pay-Per-View, Video on-Demand, Pay Television Transmissions, and Non-Premium Subscription Television programming, and transmissions of Commercial Audio Visual Content using Undefined Business Models that are permitted to be encoded Copy Never or Copy One Generation pursuant to the process set forth in 15 C.F.R. § 76.1906, as that regulation existed on July 1, 2004.

"Fixed Keys" has the meaning set forth in the Specification

"Hospitality Environment" means any commercial, health-care, or educational location, facility or conveyance that provides temporary accommodation, lodging, housing or in-patient care including, but not limited to, hotels, motels, timeshare units, truck stops, hospitals, cruise ships, airplanes, and the like.

"Multichannel Video Program Distribution System" means a system that makes available for purchase, by subscribers or customers, multiple channels of video programming. Such systems include, but are not limited to, cable systems, multichannel multipoint distribution systems, and direct broadcast satellite systems.

"Pro:Idiom" means the methods of key generation, encryption, decryption, key modification, key renewal and forensic marking defined in the Specification.

"Pro:Idiom Adopter" means a Pro:Idiom Content Participant, Pro:Idiom Manufacturer, or Pro:Idiom System Provider.

"Pro:Idiom Agreement" means a (i) Pro:Idiom Content Protection System Content Participant Agreement, (ii) Pro:Idiom Content Protection System Manufacturer Agreement, or (iii) Pro:Idiom Content Protection System Provider Agreement.

"Pro:Idiom Content Participant" means an entity that has entered into a Pro:Idiom Content Protection System Content Participant Agreement.

"Pro:Idiom Content Protection System Manufacturer Agreement" means the Pro:Idiom license agreement between Zenith and parties who wish to manufacture Pro:Idiom encryption equipment.

"Pro:Idiom Content Protection System Provider Agreement" means the Pro:Idiom license agreement between Zenith and parties who wish to own and operate Pro:Idiom encryption equipment for both pay per view applications as well as the distribution of "free to guest" content.

"Pro:Idiom Content Protection System Content Participant Agreement" means the Pro:Idiom agreement between Zenith and parties who wish to use and implement Pro:Idiom.

"Pro:Idiom Manufacturer" means an entity that has entered into a Pro:Idiom Content Protection System Manufacturer Agreement with Zenith.

"Pro:Idiom Protected Content" means Commercial Audiovisual Content encrypted using Pro:Idiom.

"Pro:Idiom Licensed Product" means a product that (i) has been produced under authority of a Pro:Idiom license, (ii) uses, implements or incorporates Pro:Idiom as defined in the Specification, (iii) complies with the Compliance Rules, and (iv) is intended for use within the Field of Use.

"Pro:Idiom Sink Function" means a function in a product or component that decrypts Pro:Idiom Protected Content received from a Pro:Idiom encrypted transmission.

"Pro:Idiom Source Function" means a function in a product or component that encrypts Commercial Audiovisual Content using Pro:Idiom.

"Pro:Idiom System Provider" means an entity that has entered into a Pro:Idiom Content Protection System Provider Agreement with Zenith.

"Specification" means, collectively, the documents entitled "Level 1 Manufacturer Implementation Specification Version 1.0," and "Level 2 Manufacturer Specification Version 1.0."

"Transcoder" means a Pro:Idiom Licensed Product consisting of a single integrated, self-contained, stand alone unit containing a Pro:Idiom Source Function that is designed to receive Commercial Audiovisual Content transmitted to the public and to encrypt and output that content and only that content using Pro:Idiom.

"Zenith" means Zenith Electronics LLC.

Cross-Reference to Definitions in FCC Regulations. The terms "Non-Premium Subscription Television", "Pay-Per-View", "Pay Television Transmission", "Undefined Business Models" and "Video-on-Demand" shall have the meanings set forth in 15 C.F.R. § 76.1902, as that regulation existed on July 1, 2004, except that as used in such definitions, the term "Covered Entity" shall mean a System Provider as defined herein, the term "Commercial Audiovisual Content" shall have the meaning set forth herein, and the term "Covered Device" shall mean a product that implements Pro:Idiom in accordance with the Specification and Pro:Idiom Compliance Rules within and limited to the Field of Use under a Pro:Idiom Agreement, all as defined herein.

Key Renewal (pursuant to Section B.8 of the Agreement):

General. The Specification includes means by which the system may be renewed, causing receiving devices in the field with old Fixed Keys to be unable to decrypt content protected by Pro:Idiom using the newly-issued Fixed Keys.

Renewal Criteria. System renewal is appropriate in the event of clear evidence that Pro:Idiom Protected Content has been decrypted other than by a Pro:Idiom System Provider exercising its rights under a Pro:Idiom Content Protection System Provider Agreement. For avoidance of doubt, a copy of Pro:Idiom Protected Content made by (i) optical coupling or (ii) defeat of security measures in place between a Pro:Idiom Licensed Product and a display device shall not be the basis for system renewal. Multiple copies of digital files recovered with forensic marking intact from non-authorized sources would constitute clear evidence of a security breach and would be grounds for a key renewal.

Recipients Obligations and Process for Implementing Renewal. Upon Zenith's announcement of a renewal, LICENSEE will promptly provide effected Recipients with a new Fixed Key set ("Renewed Keys"). LICENSEE shall install the Renewed Keys in any Pro:Idiom Licensed Product covered by this Agreement within thirty (30) days following Recipient's receipt of the Renewed Keys.

APPENDIX B: NACE PRO:IDIOM TRANSCODER LICENSE

NACE PRO:IDIOM TRANSCODER LICENSE

Whereas the party signing below ("Recipient") has not executed a Pro:Idiom Content Protection System Agreement, or otherwise is not currently a Pro:Idiom Adopter, but desires to receive or buy Transcoders, Recipient hereby acknowledges and agrees as follows.

H.1 Definitions. Capitalized terms not otherwise defined herein have the definition set forth in Attachment 1.

H.2 Rights granted. Upon receiving Transcoders subject to this agreement, Recipient shall have the rights to (i) use the Transcoders to receive Commercial Audiovisual Content transmitted to the public by a Multichannel Video Program Distribution System and to encrypt that content, and only that content, using Pro:Idiom in accordance with the Specification for transmissions to Pro:Idiom Licensed Products containing Pro:Idiom Sink Functions within the Hospitality Environment, (ii) sell, offer for sale, or distribute the Transcoders to Pro:Idiom Adopters, and (iii) transfer or distribute, or offer for transfer or distribution Transcoders to others that are not Pro:Idiom Adopters ("Transcoder Recipients"), on the condition that each such Transcoder Recipient executes this Transcoder License and provides an executed copy to North American Cable Equipment, Inc. at the address set forth below, and that such transfer is subject to the terms and conditions in this Transcoder License.

H.3 Marking Requirement. Recipient shall configure Pro:Idiom Sink Function devices (e.g., television sets that receive transmissions from Transcoders) with information that can be used to trace the source of a Pro:Idiom signal back to the individual Pro:Idiom Source function (Transcoder) prior to any use and maintain the accuracy of such configuration to reflect any future changes using a "stand alone" methodology supplied by a licensed Pro:Idiom Adopter.

H.4 No modification. Recipient shall not modify Transcoder, by hardware or software or otherwise, or alter its operations or function in any way.

H.5 No disclosure or reverse engineering. Transcoders include and embody confidential and proprietary information that is the property of Zenith Electronics Corporation and/or its Affiliates. Recipient shall neither reverse engineer the Transcoder, nor disclose any confidential or trade secret information embodied in the Transcoder to others.

H.6 Representations and Warranties. Recipient represents and warrants that it has received a copy of a Pro:Idiom Content Protection System Agreement, and that it understands and is able to comply with the terms included and incorporated herein.

H.7 Indemnification. Recipient shall, defend, indemnify and hold harmless North American Cable Equipment, Inc. and its respective officers, members, representatives, agents, directors, equivalent corporate officials, and employees from and against any and all damages, costs and expenses (including without limitation reasonable attorneys' fees and related expenses) to the extent arising from a third party legal claim against the foregoing based on (i) any Material Breach of this agreement, (ii) the use of Transcoders or Pro:Idiom by Recipient in any manner other than as expressly authorized by this agreement, (iii) the use of Transcoders by Recipient in any manner contrary to any provision of applicable law (not including third party intellectual property rights where Recipient is otherwise in compliance with this agreement and the law), or (iv) the use of modifications, alterations, combinations or enhancements of Transcoders or Pro:Idiom by Recipient.

H.8 Renewal. Recipient acknowledges that in the event of a Pro:Idiom security breach, a renewal of the Pro:Idiom system may be required under conditions described in an applicable Pro:Idiom Content Protection System Agreement. Such renewal may include Recipient's Transcoders and other devices containing a Pro:Idiom Sink Function (e.g., television sets that receive transmissions from Transcoders). In the event such renewal is required, Recipient acknowledges and accepts that some disruption in operation of its affected Transcoders is likely, and that Recipient

will need to perform steps in the renewal process, as directed by Zenith, a Pro:Idiom Adopter or a Multichannel Video Program Distribution System operator, in order to reactivate such Transcoders. Recipient hereby agrees to hold harmless North American Cable Equipment, Inc., Pro:Idiom Adopters, and, if instructions are received from a Multichannel Video Program Distribution System operator, such operator, from any disruption in operation of its Transcoders resulting from a renewal process initiated pursuant to the Pro:Idiom Content Protection System Agreements.

For further explanation about system renewal, Recipient may request a copy of a current Pro:Idiom Content Protection System Agreement from Zenith Electronics Corporation, at 2000 Millbrook Drive Lincolnshire, IL 60069 ("Zenith").

H.9 Notice. Recipient shall provide an executed copy of this Transcoder License to North American Cable Equipment, Inc.. at the address below within ten days of execution. Facsimiles and electronic copies are acceptable provided they contain original signatures. An executed copy will be returned to the address listed below.

H.10 Effective Date. This agreement is effective on the date North American Cable Equipment, Inc. receives an executed copy from Recipient.

Signature) _____

Name) _____

Company) _____

Address) _____

_____

Phone/Email _____

For North American Cable Equipment, Inc.

_____

Aaron Starr

1085 Andrew Drive

Suite A

West Chester, PA 19380

Fax: 1-610-429-3060

ATTACHMENT 1 TO NACE PRO:IDIOM TRANSCODER LICENSE: DEFINITIONS

"Field of Use" means the use of Pro:Idiom in the Hospitality Environment in accordance with the Specification and the Pro:Idiom Compliance Rules (as set forth in a Pro:Idiom Content Protection System agreement) to encrypt and decrypt Pay-Per-View, Video-on-Demand, Pay Television Transmissions, and Non-Premium Subscription Television programming, and transmissions of Commercial Audio Visual Content using Undefined Business Models that are permitted to be encoded Copy Never or Copy One Generation pursuant to the process set forth in 15 C.F.R. § 76.1906, as that regulation existed on July 1, 2004.

"Hospitality Environment" means any commercial location, facility or conveyance that provides temporary accommodation, lodging, housing or in-patient care including, but not limited to, hotels, motels, timeshare units, truck stops, hospitals, cruise ships, airplanes, and the like.

"Multichannel Video Program Distribution System" means a system that makes available for purchase, by subscribers or customers, multiple channels of video programming. Such systems include, but are not limited to, cable systems, multichannel multipoint distribution systems, and direct broadcast satellite systems.

"Pro:Idiom" means the methods of key generation, encryption, decryption, key modification, key renewal and forensic marking defined in the Specification.

"Pro:Idiom Adopter" means a Pro:Idiom Content Participant, Pro:Idiom Manufacturer, or Pro:Idiom System Provider.

"Pro:Idiom Licensed Product" means a product that (i) has been produced under authority of a Pro:Idiom Content Protection System Manufacturer Agreement, (ii) uses, implements or incorporates Pro:Idiom as defined in the Specification, (iii) complies with the Pro:Idiom Compliance Rules, and (iv) is intended for use within the Field of Use.

"Pro:Idiom Sink Function" means a function in a product or component that decrypts Pro:Idiom Protected Content received from a Pro:Idiom encrypted transmission.

"Pro:Idiom Source Function" means a function in a product or component that encrypts Commercial Audiovisual Content using Pro:Idiom.

"Specification" means, collectively, the documents entitled "Level 1 Manufacturer Implementation Specification Version 1.0," and "Level 2 Manufacturer Specification Version 1.0," as such documents may be amended in accordance with this Agreement.

"Transcoder" means a Pro:Idiom Licensed Product consisting of a single integrated, self-contained unit containing a Pro:Idiom Source Function that is designed to receive Commercial Audiovisual Content transmitted to the public by a Multi-channel Video Program Distribution System and to encrypt that content and only that content using Pro:Idiom.

Key Renewal

General. The Specification includes means by which the system may be renewed, causing receiving devices in the field with old Fixed Keys to be unable to decrypt content protected by Pro:Idiom using the newly-issued Fixed Keys.

Renewal Criteria. System renewal is appropriate in the event of clear evidence that Pro:Idiom Protected Content has been decrypted other than by a Pro:Idiom System Provider exercising its rights under a

Pro:Idiom Content Protection System Provider Agreement. For avoidance of doubt, a copy of Pro:Idiom Protected Content made by (i) optical coupling or (ii) defeat of security measures in place between a Pro:Idiom Licensed Product and a display device shall not be the basis for system renewal. Multiple copies of digital files recovered with forensic marking intact from non-authorized sources would constitute clear evidence of a security breach and would be grounds for a key renewal.

Recipients Obligations and Process for Implementing Renewal. Upon Zenith's announcement of a renewal, LICENSEE will promptly provide effected Recipients with a new Fixed Key set ("Renewed Keys"). Licensee shall install the Renewed Keys in any Pro:Idiom Licensed Product covered by this Agreement within thirty (30) days following Recipient's receipt of the Renewed Keys.