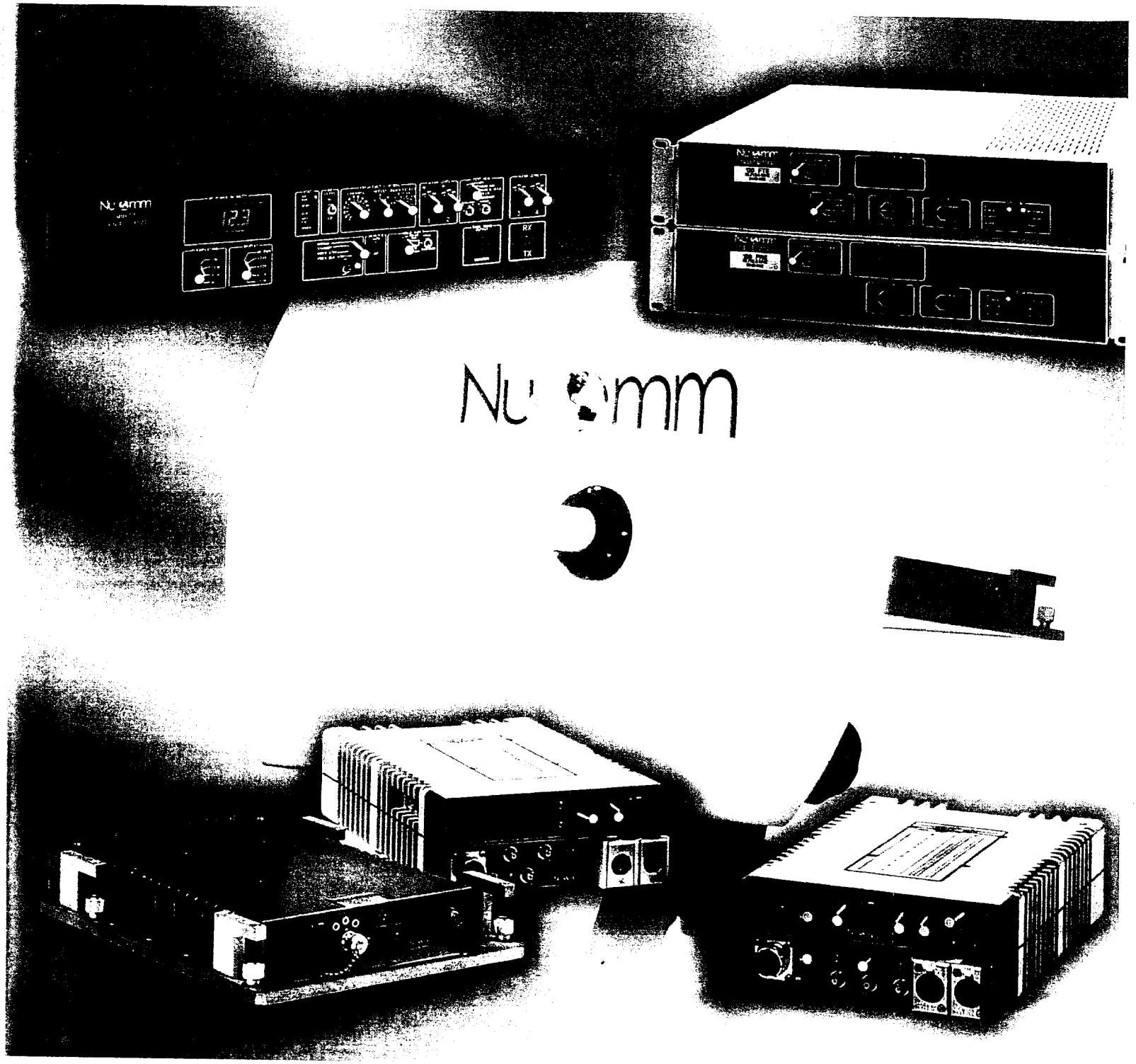

# NuComm

MICROWAVE SOLUTIONS FOR THE DIGITAL AGE™

101 Bilby Road Hackettstown, NJ 07840 USA • 908-852-3700 • Fax: 908-813-0399 • www.nucomm.com

M17-0001-00A
[NEWSCASTER VT1]
Rev. 3; 21 June 2001

**Single & Multi-Band**
**NEWSCASTER VT1 Digital-Analog** ENG/OB Microwave Transmitter
Mast Mounted Microwave Transmitter System
Model No. _____

Serial No. _____

Customer: _____

TM

Frequency Range _____ to _____ MHz

Frequency Range _____ to _____ MHz

Power Output _____ Watt

____ NTSC; _____ PAL - Video Emphasis

____ 75usec _____ 50usec - Audio Emphasis

Subcarrier Frequency: _____ MHz, _____ MHz

Subcarrier Frequency: _____ MHz, _____ MHz

IF Frequency: _____ MHz

Prime Power: 90 to 260 Volts AC 40 to 60 Hz

Optional Power: ±11 to ±15 Volts DC

Nucomm, Inc.
101 Bilby Road
Hackettstown, NJ 07840
Tel: 908 852-3700 FAX: 908 813-0399
www.Nucomm.com

## PROPRIETARY INFORMATION



**Nucomm, INCORPORATED**
101 Bilby Road
Hackettstown, NJ 07840

Specifications are subject to change in order to allow for the introduction of design improvements

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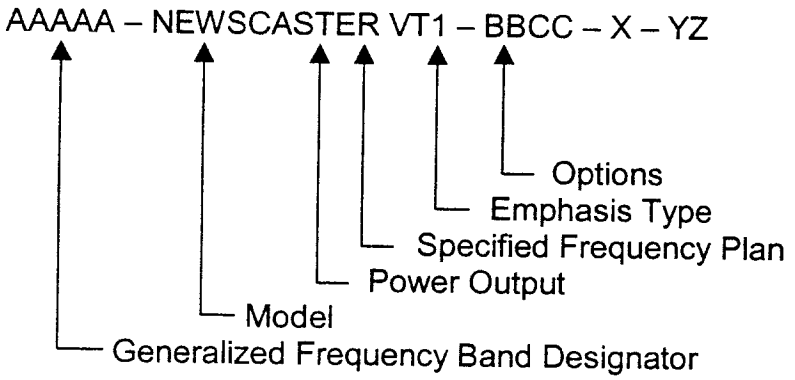
# 1.0 DESCRIPTION

Nucomm's NEWSCASTER VT1 series **NEWSCASTER VT1** is a Digital-Analog ENG/OB Microwave Transmitter. The Mast Mounted Microwave Transmitter System is designed to operate in any specified band in the 1.00 to 15.5 GHz frequency range. Each unit is field programmable and configurable to meet a wide range of customer requirements. Typical features include RF and Subcarrier frequency field programmability, Digital and Analog operation, antenna polarization control, RF power control, optional Pan & Tilt control, local LCD display for control and monitoring, remote control and monitoring with optional software, optional multi-band operation and many other features and options.

This manual is written in a general form to cover all configurations and options for the NEWSCASTER VT1 within the 1.00 to 15.5GHz frequency range.

The chart on the front cover of this manual gives the specified frequency channel assignments for the particular model. The specific serial number is listed on the front cover sheet of this manual. The front cover sheet of this manual also lists the detailed configuration for this specific model and serial numbered unit.

The parts lists and drawings in Section 7 are used in the unit specified.



Where:

AAAA = mean frequency band center in GHz rounded to the closest GHz. This number is then multiplied by 10. For multiple bands, each center frequency designation is separated by a backslash "/".

BB = See Power Output Designation table below:

Power Output Designator
E = 5 Watt
L = 12 Watt

CC = Nucomm assigns a frequency chart number for each unique frequency channel combination. The specific frequency-channel assignment for the unit covered by this manual is given in the chart as shown on the front cover of this manual.

X = Type Emphasis; 1 = NTSC and PAL M; 2 = PAL B/G
YZ = Options as listed below

Options
G = 160 VDC Pan & Tilt
G1 = 12 VDC Pan & Tilt
I = Four Contact Closures
J = NSI Antenna
K = Radio Waves Antenna
T = Color Bars
U1 = 90 to 260 VAC
U3 = 11 to 15 VDC

The convention of this manual to show options that are not a standard part of the NEWSCASTER VT1 will be shown by shaded text as shown here.

## 1.1. Features

**Configuration:**

Nucomm's **NEWSCASTER VT1** Series Digital-Analog ENG/OB Microwave Transmitters are the most comprehensive ENG/OB radio in the world. Their features are designed for both Analog and Digital operation in such applications as ENG/OB trucks, portable links, helicopters, etc. In the Digital mode the NEWSCASTER will accept an external digitally modulated signal with QPSK, 8PSK, 16QAM, 8VSB, COFDM and multi-level FSK.

See Figures 1–1 through 1–3 for the Control and RF Unit generalized block diagrams. The rugged NEWSCASTER VT1 RF Head includes the power amplifier, up-converter and low noise frequency synthesizer enclosed in a weatherproof enclosure that mounts on the antenna pan and tilt, replacing the conventional power amplifier. The NEWSCASTER VT1 Control Unit contains the video and audio processing boards, power supply and 70 MHz modulator. The 70 MHz IF, +48VDC, and data subcarrier are sent up a 75-Ohm cable (part of Nycoil assembly) that feeds the RF Unit next to the antenna. Many state-of-the-art options are available, some not found on any other ENG/OB Transmitters. This arrangement is a more cost-effective approach to the traditional ENG/OB Microwave Transmitter Systems.

The Nucomm NEWSCASTER VT1 Series of mast mounted ENG/OB transmitters are available in either single or dual models. This manual covers the single and multi-band models in the NEWSCASTER VT1 series, as indicated in Table 1-1. Refer to the front cover of this manual for channel-frequency assignments. For dual band, NEWSCASTER VT1 transmitters use only the appropriate bands that apply to the unit supplied.

The multi-band unit provides full coverage of the 2.5 and 7 GHz bands. Band and channel selections are clearly viewed and controlled by the front panel LCD interface. Synthesized tuning assures precise setting of transmitter frequency. A single type "N" RF output connector is standard, however, multi-band NEWSCASTER VT1 transmitters may be ordered with either single or multiple Type "N" RF output connectors for maximum flexibility.

**Frequency Coverage:**

The Nucomm NEWSCASTER VT1 is available in single or dual-band models. This manual covers the single and dual band NEWSCASTER VT1. The chart on the front cover of this manual lists the frequencies covered for the indicated serial numbered unit. Channel selection is accomplished through the front panel LCD controls. Synthesized tuning assures precise setting of the transmitter frequency.

**Prime Power:**

All NEWSCASTER VT1 mast mounted transmitters feature a built-in AC power supply, which operates on AC power ranging from 90 to 260 VAC and 40 to 60 Hz. The NEWSCASTER VT1 automatically adapts to the input voltage without requiring internal jumpers or switch settings. The NEWSCASTER VT1 is also available in a DC powered unit using +11 to +15 VDC.

**Audio Subcarriers:**
Two (four optional) field programmable synthesized audio subcarriers feature individual LINE/OFF/MIC/TONE source selection, level indicating bar graphs, and automatic gain control (AGC). The subcarrier frequencies, Mode, and additional gain are front panel adjustable using the LCD interface.

**Standby Mode:**
In the *Standby* mode, the NEWSCASTER VT1 is powered on, but the RF output is muted, enabling the transmitter to be tuned safely without radiating *off-frequency* emissions. The NEWSCASTER VT1 will remain in *Standby* until on-frequency lock has been obtained. Switching from *Standby* to the *Normal* (operating) mode results in instantaneous on-frequency transmission. If the synthesizer has not attained lock when the *Standby* switch is switched to *Normal*, the unit will remain in *Standby* until *on-frequency* lock has been obtained.

**Signal Strength Indicators:**
Transmitted signal strength is indicated on the LCD display by a digital readout. The digital readout indicates the transmitted signal level directly in watts. This is intended as an approximate reading of power.

**Video Presence Detector:**
The Video Presence Remote Standby mode enables the camera operator to remotely turn on the color bars or put the NEWSCASTER VT1 in standby.

**Internal Self-Test:**
Built-in diagnostic features include a 1 kHz audio test tone and a 761.5 kHz *(1.512 MHz for PAL)* video deviation test signal.

**Other Standard Features:**
- Digitally synthesized microwave oscillator tuning
- Independent Automatic Gain Control (AGC) for microphone and line inputs (Two audio subcarriers standard, four optional)
- RS232/RS485/RS422 Remote
- Antenna Polarization Control
- Power Adjustments
- Analog/Digital Operation
- Field Programmable RF and ASC settings
- Four contact closures

### 1.2. Physical Description

The master control unit measures 19.0 inches (48.1 cm) wide by one 1.75 inches (4.43 cm) high by 13.0 inches (32.9 cm) deep. The mast mounted RF unit measures 9.0 inches (22.8 cm) wide by 10.0 inches (25.3 cm) long by 3.75 inches (9.5 cm) high in a ruggedized housing and is designed to withstand rough handling in the field. The case is weather-resistant and all connectors are weatherproofed.

### 1.3. Options

- Test Pattern/ID Test Generator:
  The optional Test Generator provides:
  - SMPTE RS-170A Color Bars *(EBU Pattern)*
  - A 16-character programmable ID: (This ID can be placed in the Vertical Interval and Genlocked to the incoming Video signal)
  - A Multiburst/Linear Ramp test pattern
- Pan & Tilt Controller
- Remote Control Software:
  The NEWSCASTER VT1 can be full monitored and controlled from an IBM Compatible PC through a RS232C/RS422/RS485 port.

### 1.4. Accessories

NEWSCASTER VT1 transmitters are shipped with an AC power cord and this manual.

With the addition of a modem, the NEWSCASTER VT1 can pass DS3 or a variety of digital signals. The NEWSCASTER VT1 can accept PSK, QPSK, 8PSK, 16QAM, and COFDM signals directly through the 70 MHz input connector with no internal modifications.

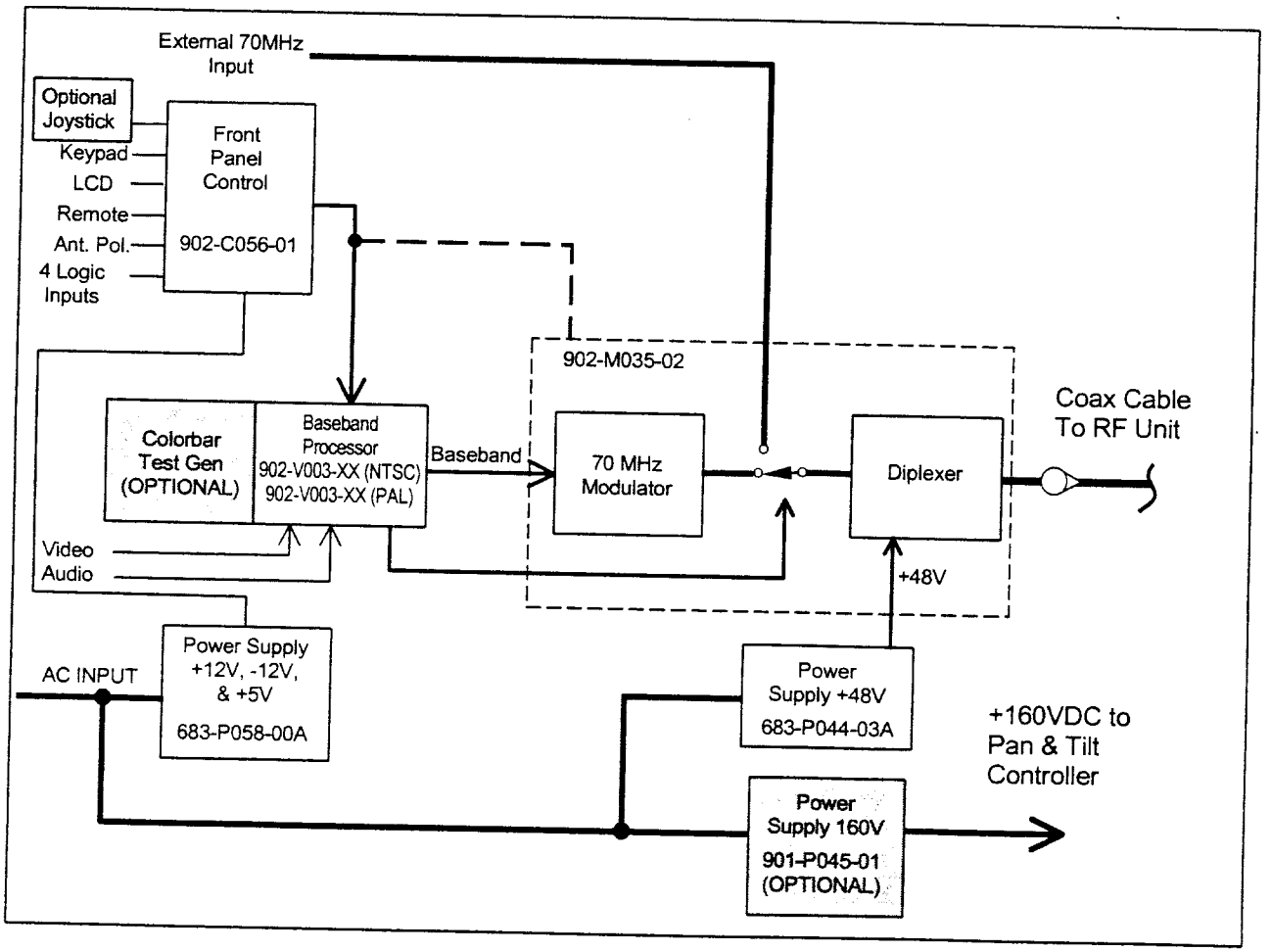



**Figure 1-1 NEWSCASTER VT1 Control Unit Block Diagram**

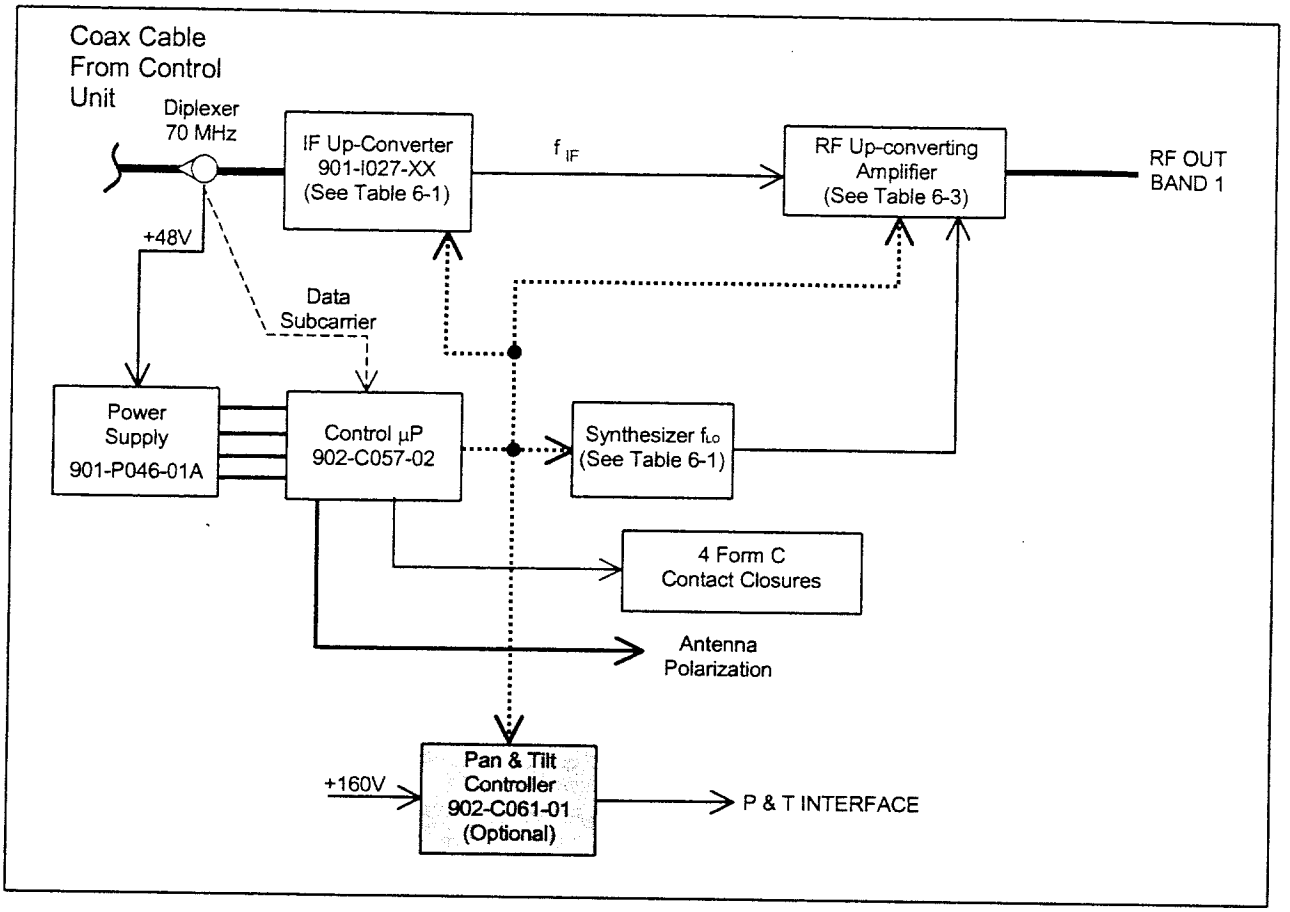



**Figure 1-2 NEWSCASTER VT1 Single Band RF Unit Block Diagram**

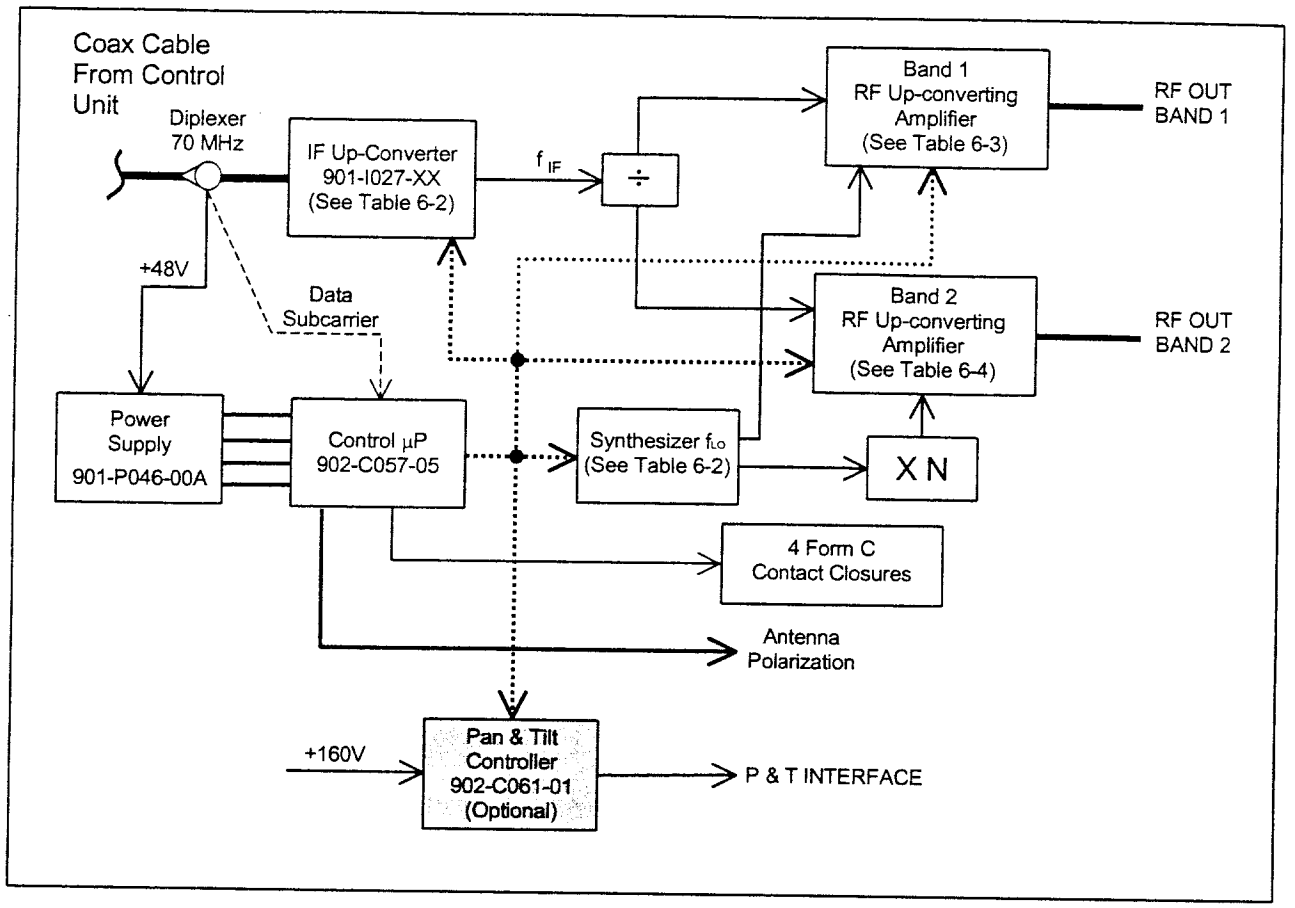



**Figure 1-3 NEWSCASTER VT1 Dual Band RF Unit Block Diagram**

## 1.5. Specifications

### Table 1-1 NEWSCASTER VT1 Specifications

| DESCRIPTION | PERFORMANCE |
|---|---|
| **RF OUTPUT** | |
| (See front cover sheet for non-US model configurations) | Analog/Digital Mode Pwr-Watts (Typ./Min.) |
| All Units | Refer to Tables 5-4 through 5-6 |
| Standby | 0 Watts |
| Frequency Stability | +0.0005% (-30°C to +60°C) |
| Output Impedance | 50 Ohms, unbalanced |
| Return Loss | 26 dB, minimum |
| Output Connector | Type "N" female |
| Modulation Sense | Positive |
| **VIDEO/BASEBAND** | |
| Video Format | |
| NTSC | 525 lines |
| PAL | 625 lines |
| Video Input | 1 Volt (p-p) for ±4 MHz deviation |
| Baseband (Composite) Input | 1 Volt (p-p) for ±4 MHz deviation |
| Input Impedance | 75 Ohms |
| Input Return Loss | 26 dB (10 Hz to 5 MHz) |
| Input Connector | BNC female |
| Pre-Emphasis | Per CCIR Recommendation 405 |
| **TRANSMISSION PERFORMANCE** (Typical for a Nucomm receiver in a one-hop radio link with a -40 dBm received signal level) | |
| Frequency Response (With standard video input filter) | ±0.25 dB, (10 Hz to 3.9 MHz) |
| Line Time Distortion | 1.0 IRE p-p |
| Field Time Distortion | 1.0 IRE p-p |
| T-Bar Ringing | 4.0 IRE p-p |
| 2T Pulse | |
| Pulse to Bar Ratio | ±2.0 IRE p-p |
| Ringing | 4.0 IRE p-p |
| Long Time Distortion | 35 IRE p-p |
| 12.5T Pulse | |
| Gain (RCL) | ±2.0 IRE |
| Delay (RCD) | |
| Video Input | 40 ns |
| Composite Output | 20 ns |

## Table 1-1. NEWSCASTER VT1 Specifications
*(Continued)*

| | |
|---|---|
| Luminance Non-Linearity | 2% |
| Differential Gain | 1%, (10 to 90% APL) |
| Differential Phase | 1.0°, (10 to 90% APL) |
| Signal-to-Noise Ratio (p-p luminance to RMS noise; EIA/CCIR weighing) | |
| 2.0-2.5 GHz | 65 dB, minimum (10 kHz to 5 MHz) |
| 6.4-7.2 GHz | 63dB, minimum (10 kHz to 5 MHz) |
| 12.7-13.3 GHz | 63 dB, minimum (10 kHz to 5 MHz) |
| Signal-to-Hum Ratio (p-p luminance/RMS) | |
| 2.0-2.5 GHz | 55 dB, minimum (0 to 10 kHz) |
| 6.4-7.2 GHz | 55 dB, minimum (0 to 10 kHz) |
| 12.7-13.3 GHz | 55 dB, minimum (0 to 10 kHz) |
| **AUDIO** | |
| Audio Channels 4 (independently selected inputs) | |
| Subcarrier Frequency Range | 4.83 to 8.59 MHz; 1 kHz increments |
| Audio Input | |
| Line | +8 dBm, 600 Ohms (NTSC – other levels available) |
| Microphone | –50 dBm, 150 Ohms |
| Frequency Response | ±0.5 dB, (40 Hz to 10 kHz)<br>±1.0 dB, (10kHz to 15 kHz) |
| Audio Emphasis | |
| Standard NTSC | 50 µs |
| Optional PAL | 75 µs |
| Subcarrier Deviation | |
| Standard NTSC | 75 kHz peak @ 1 kHz test tone |
| Optional PAL | 100 kHz peak @ 1 kHz test tone |
| Audio Connectors | 3-Pin XLR |
| Signal to Noise Ratio (75 µs emphasis; 75 kHz Dev.) | |
| Line Audio | 65 dB (40 Hz to 22 kHz) |
| Microphone | 55 dB |
| Total Harmonic Distortion (75 kHz Dev.) | |
| Line Audio* | 0.5%, maximum (40 Hz to 15 kHz) |
| Microphone | 1.0%, maximum |
| *Measured at –10 dBm Input Level | |
| **70MHz Input** | |
| Input Impedance | 75 Ohms |
| Input Return Loss | 26 dB |
| Input Connector | BNC female |
| Input Level | |
| Analog | –5 to +5 dBm |
| Digital | –5 to +5 dBm |

## Table 1-1. NEWSCASTER VT1 Specifications
*(Continued)*

| | |
|---|---|
| **POWER REQUIREMENTS** | |
| Voltage | |
| AC Only | 90 to 240 Volts, 40 to 60 Hz |
| DC Only (Optional) | +11 to +15 Volts |
| Power Consumption | 80 watts, typical |
| Power Connector | MS-Type, 18 Pin detoronics DT02H-14 mating connector ACTEL MS3116F14-18S |
| **PHYSICAL** | |
| Dimensions (H x W x D) | |
| Control Unit | 1.75" x 19.0" x 13.0" (4.43 cm x 48.1 cm x 32.9 cm) |
| RF Unit | 3.75" x 9.0" x 10.0" (9.5 cm x 22.8 cm x 25.3 cm) |
| Weight | |
| Control Unit | 6 lbs. (13.2 kg.) |
| RF Unit | 14 lbs. (30.9 kg.) |
| Temperature | |
| Meets all specifications | -10° C to +60° C |
| Storage | -10° C to +80° C |
| Relative Humidity | 95% (0° to 40° C) |
| Altitude | |
| Operating | 20,000 feet (6,000 meters) |
| Storage | 50,000 feet (15,000 meters) |

# 2.0 CUSTOMER SERVICE INFORMATION

## 2.1. Equipment Returns

Customer Service technicians at Nucomm are available to extend technical assistance to customers installing or operating Nucomm equipment. They will also assist customers with equipment troubleshooting. If this cannot be successfully accomplished by telephone, the equipment may be returned to the factory for repair. Loaner equipment is often available until Nucomm is able to ship repaired units. The Nucomm Customer Service telephone number is (908) 852-3700.

Do not return any Nucomm product to the factory until you have received a return authorization (RA) number and shipping instructions from Nucomm.

When returning equipment to Nucomm, please enclose a letter containing the following:

RA number, model number, serial number, frequency operating range (in the case of modules), a detailed description of the problem and the name of an engineer or technician we may contact. Include a "ship to" and "bill to" address.

In the case of units being shipped from outside the United States, Nucomm recommends the use of a courier such as Federal Express, UPS, etc and that the goods be shipped DOOR-TO-DOOR PRE-PAID. This will eliminate Customs cost, handling charges and delays. Enclose all the information above, plus a statement that the equipment was manufactured in the United States (the latter is needed to expedite customs processing). Nucomm evaluates all returned units free of charge and then confers with customers on corrective action.

Ship to:

Nucomm, Inc.
101 Bilby Road
Hackettstown, New Jersey 07840

**INTERNATIONAL:**

In the case of units being shipped from outside the United States, Nucomm recommends the use of a courier such as Federal Express, UPS, etc and that the goods be shipped DOOR-TO-DOOR PRE-PAID. This will eliminate Customs costs, handling charges and delays. Enclose all the information above, plus a statement that the equipment was manufactured in the United States (the latter is needed to expedite customs processing). Nucomm evaluates all returned units free of charge and then confers with customers on corrective action.

## 2.2. Telephone Consultation

Should there be a need for emergency telephone consultation, please have your model number and serial number available for the Customer Service representative. Nucomm Customer Service representatives are available to deal with all technical questions or difficulties.

## 2.3. Replacement Modules

Troubleshooting to the component level is often not cost-effective and frequently impossible. Often the practical method of effecting field repairs is to substitute

known good spare modules for suspect units. Nucomm maintains an inventory of replacement modules for its complete line of products. Contact your sales representative to order replacement parts or modules.

### 2.4. Field Repair

Nucomm products are designed with easy access to components to facilitate service. When troubleshooting the NEWSCASTER VT1, the user is cautioned to first read the module descriptions in this manual.

Many Nucomm modules cannot be serviced in the field. Warnings are included in the circuit descriptions and are labeled on certain modules. To prevent the voiding of the Nucomm warranty protecting the equipment, please contact Nucomm before attempting any repairs or servicing.

### 2.5. Shipping Damage

Equipment shipped FOB Nucomm, Inc.; plant shall become the property of buyer upon delivery to and receipt from carrier. Any damage in shipment should be handled by the buyer directly with the carrier. Immediately request the carrier's inspection upon evidence of damage in shipment.

Do not return any Nucomm product to the factory until a return authorization (RA) number has been given, along with shipping instructions, as discussed previously.

### 2.6. Contact Information

Correspondence may be addressed to:

Nucomm, Inc.
101 Bilby Road
Hackettstown, New Jersey 07840

Our phone number is: (908) 852-3700

Our FAX number is: (908) 813-0399

Nucomm's Service Dept. can be contacted by e-mail at service@Nucomm.com. For 24 hour emergency service, our Customer Service Manager can be contacted by pager at (908) 515-3709.

Equipment manufactured by Nucomm, Inc. is warranted to meet all published specifications and to be free from defects in material and workmanship within a period of two years, from date of shipment from factory. The company's liability under this warranty is limited to:

- Servicing or adjusting equipment
- Replacement of defective parts

Any equipment returned to the factory shall have the freight paid by buyer. Equipment showing damage by misuse, abnormal conditions of operation, or attempts to repair by other than authorized service personnel shall be excluded from this warranty. Nucomm, Inc. shall in no event be responsible for incidental injury or property damage. Since Nucomm, Inc., has no control over conditions of use, no warranty is made or implied as to suitability for customer's intended use, beyond such performance specifications as are made part of the purchase order. There are no warranties expressed or implied, except as stated herein. This limitation on warranties shall not be modified by verbal representations.

# 3.0 WARRANTY

## 3.1. Equipment Warranty

Equipment manufactured by Nucomm, Inc. is warranted to meet all published specifications and to be free from defects in material and workmanship within a period of two years from date of shipment from the factory. The company's liability under this warranty is limited to:

- Servicing or adjusting equipment.
- Replacement of defective parts

Any equipment returned to the factory shall have the freight paid by buyer.

Equipment showing damage by misuse, abnormal conditions of operation, or attempts to repair by other than authorized service personnel shall be excluded from this warranty. Nucomm, Inc. shall in no event be responsible for incidental injury or property damage. Since Nucomm, Inc., has no control over conditions of use, no warranty is made or implied as to suitability for customer's intended use, beyond such performance specifications as are made part of the purchase order. There are no warranties expressed or implied, except as stated herein. This limitation on warranties shall not be modified by verbal representations.

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# 4.0 INSTALLATION

## 4.1. Unpacking and Inspection

Unpack the NEWSCASTER VT1 and visually inspect for possible damage to the LCD, connectors, and surface areas. If damage is found, a claim should be filed with the transportation carrier. Save the shipping container and packing material for reshipment, as needed. Figures 4-3 through 4-5 illustrate the front and rear views of the Control Unit. Figures 4-12 and 4-13, and 4-15 illustrate the front and rear views of the RF Head.

## 4.2. Mast Installation

**Mast Mounted RF Unit**

In a typical installation of the Model NEWSCASTER VT1, the RF Unit assembly is mounted on a pedestal on a pneumatic mast atop an ENG/OB van. Most broadcasters use a coiling cable conduit between the truck control unit and the top of the mast to keep the wires from tangling. The coiling cable conduit should be two times the difference between the mast extended and nested heights, (see Table 4-6 for additional information on Nycoil length).

Mount the RF Unit so that the heatsink fins are vertical. Figure 4-21 illustrates the mounting plate. *Before mounting the RF Unit, the mounting surface should be coated with a thin layer of thermal compound, such as Wakefield Engineering, Inc., Part #120-8. Failing to do this may void the warranty.* Use four (4) size ¼-20 x .750" screws to mount the plate.

## 4.3. Control Unit Installation

The NEWSCASTER VT1 Control Drawer is shipped pre-assembled. Mount the Control Unit in a standard 1U E.I.A. rack space.

## 4.4. Interconnection

Figures 4-1 and 4-2 show the interconnection between the NEWSCASTER VT1 Control Unit and the mast mounted RF Unit. To assist in preparing the Control and Monitor cable, connector pin assignments and recommended wire sizes are provided. Note that the only conductors required for operation that pass through the Nycoil are the coax (or triax) cable for power, data, and the 70 MHz IF, and power conductors for the Pan & Tilt Option.

### 4.4.1. Control Unit

Connect the video (3), audio (6), and external 70 MHz (2) to the connectors on the rear panel. Connect the video monitor to the appropriate connector (4) on the rear of the unit.

When the Pan & Tilt control option is provided, connect the Pan & Tilt Joystick to the connector (9) on the rear of the panel. Connect the power for the Pan & Tilt unit to the power connector (10) located on the rear panel.

Connect the coax (or optional triax) cable to the RF Interface (7) on the rear of the unit.

### 4.4.2. RF Head

Connect the coax (or optional triax) cable to the TNC connector labeled RF Interface (11). Connect the antenna cable to the port labeled "RF OUTPUT" (15).

Connect the antenna polarization (12) as described in Sections 4.5 and 4.6.

Refer to Section 4.7 for antenna power (13) connections.

Connect the 18-pin connector of the Pan & Tilt Power/Control cable to the connector labeled "TO PAN/TILT" (14) on the RF Unit assembly. Connect the 17-pin connector of the Pan & Tilt Power/Control cable to the Pan & Tilt motor assembly. Refer to Table 4-5 and Figure 4-20 for cable pin-outs.

### 4.5. NSI & Radio Waves Quad Antenna Polarization Interconnection

To assist in preparing the polarization cable, connector pin assignments and recommended wire sizes are provided in Table 4-3, along with the wiring diagram in Figure 4-18 for NSI antennas. For Radio Wave antennas refer to Table 4-4 and Figure 4-19. A switch inside the RF Head located on the 902-C057 board is used to select between the two antenna types.

### 4.6. Quickset Model QPT90 120VDC Pan & Tilt Interconnection

Table 4-1 and Figure 4-16 show the interconnection between the Quick Set Model No. QPT90 120VDC Pan & Tilt "motor assembly" and the RF Head.

The Pan & Tilt platform will handle a maximum load of 90lbs, with 0-355° of rotation and +/– 90° of tilt. The unit features adjustable "limit" switches to limit the extremes of rotation and tilt. The Pan & Tilt is controlled by a joystick, which is connected to the NEWSCASTER VT1 Control Unit. The operator is able to set the platform position to within 1 degree of the desired position. The Control Unit provides a digital display to indicate the azimuth as well as the degree of rotation as well as the tilt above and below the horizon.

### 4.7. Quickset Model QPT90 12VDC Pan & Tilt Interconnection

Table 4-2 and Figure 4-17 show the interconnection between the Quick Set Model No. QPT90 12VDC Pan & Tilt "motor assembly" and the RF Head.

The Pan & Tilt platform will handle a maximum load of 90lbs, with 0-355° of rotation and +/– 90° of tilt. The unit features adjustable "limit" switches to limit the extremes of rotation and tilt. The Pan & Tilt is controlled by a joystick, which is connected to the NEWSCASTER VT1 Control Unit. The operator is able to set the platform position to within 1 degree of the desired position. The Control Unit provides a digital display to indicate the azimuth as well as the degree of rotation as well as the tilt above and below the horizon.

### 4.8. Nycoil-Coiling Assy Installation

Table 4-6 shows recommended coiling cable lengths for a typical "Nycoil" cable assembly, as a function of the mast extended/nested height.

The Nycoil Cable conduit is essentially a preformed housing in the shape of a coil spring. When nested the coils stack in 15" diameter circles one above the other around the antenna mast. This protects the cables inside the housing and prevents them from becoming entangled. As the mast is extended, the coils separate like a coil spring.

### 4.9. Mechanical Installation

The standard NEWSCASTER VT1 requires no mechanical assembly, other than the required cable connections.

## 4.10. Electrical Installation

The NEWSCASTER VT1 connectors are shown in Figures 4-3 through 4-5 for the Control Unit. Details and pinouts are provided in Figures 4-6 through 4-11, along with Tables 4-1 through 4-5. Connections for the RF Head are shown in Figures 4-12 through 4-13, and Figures 4-15. Location numbers are provided for cross-reference between the Figure and descriptions.

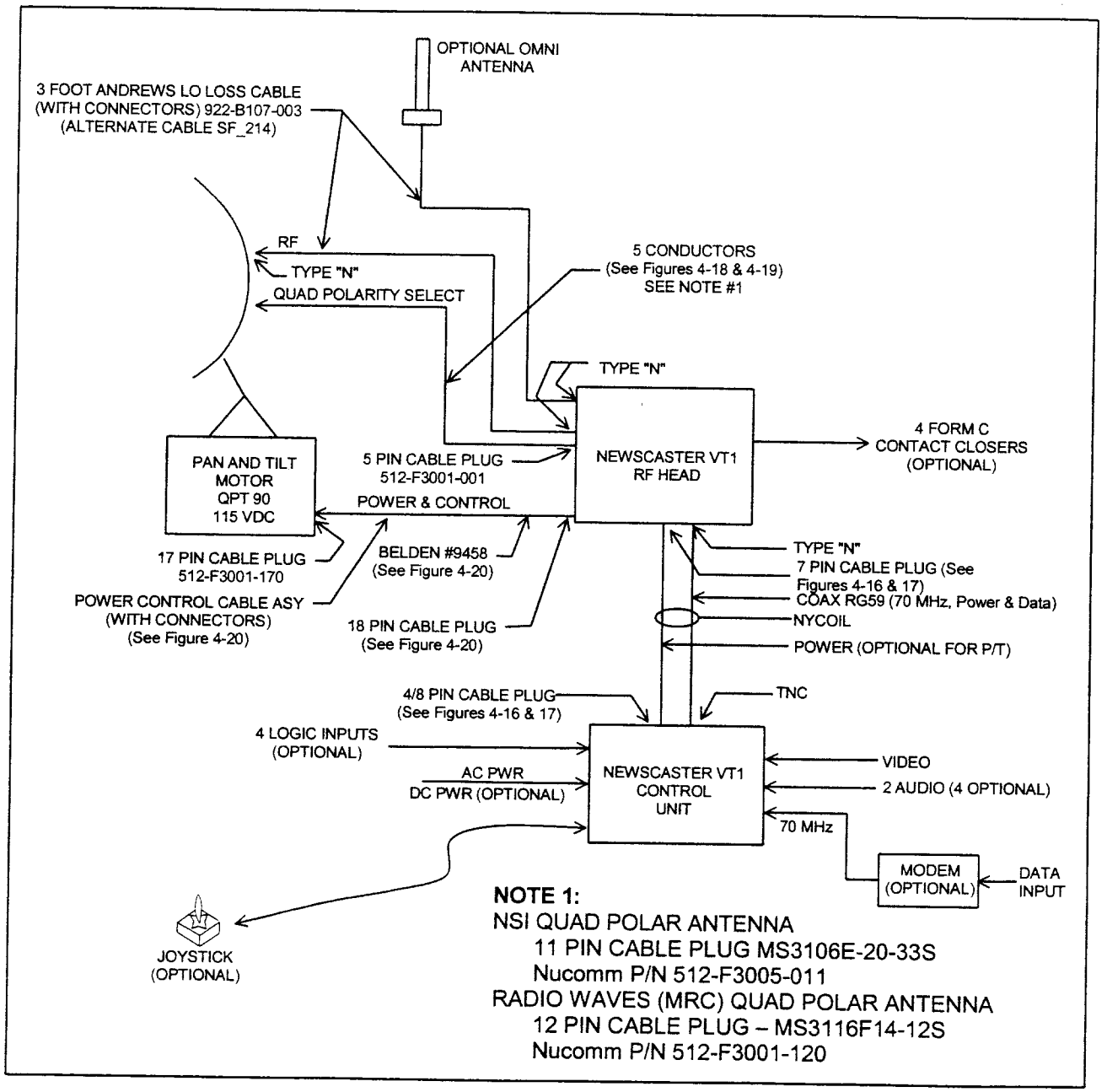



**Figure 4-1 NEWSCASTER VT1 Interconnection Diagram**

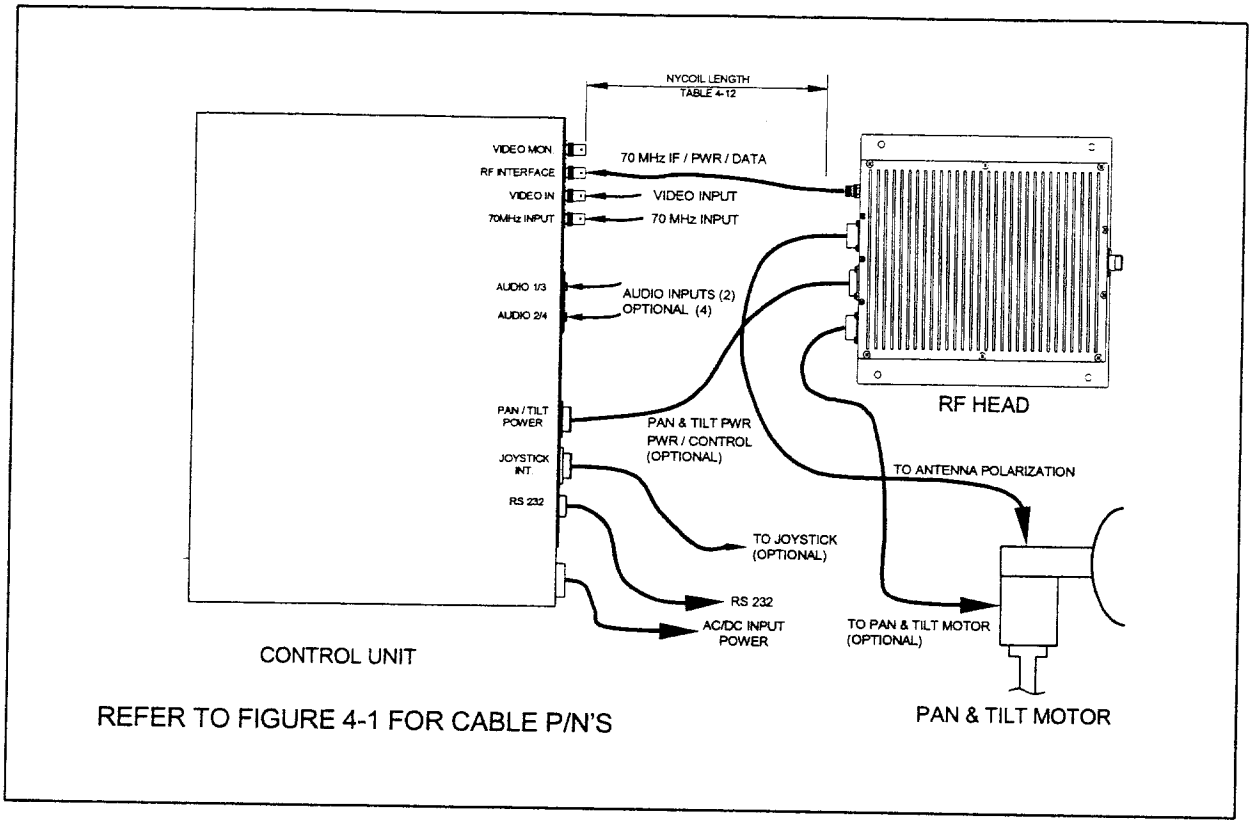



**Figure 4-2 NEWSCASTER VT1 Interconnections – Control Unit to RF Head**

### 4.10.1.Control Unit

**AC Power Connection (1):**
The NEWSCASTER VT1 Portable Transmitter features a built-in power supply that operates from AC power ranging from 90 to 260 VAC (40 to 60 Hz). The NEWSCASTER VT1 automatically adapts the input voltage and does not require any internal jumpers or switch settings.

The NEWSCASTER VT1 is shipped with an AC power cord. The AC cord plug should match the available AC power source. If not, an appropriate power cord can be ordered from the factory.

**Optional DC Power Connection (Not Shown):**
The NEWSCASTER VT1 Portable Transmitter features an optional built-in power supply that operates from DC power ranging from +11 to +15 VDC. The NEWSCASTER VT1 automatically adapts the input voltage and does not require any internal jumpers or switch settings. On the rear of the unit are three terminals. Case is for chassis ground, (–) is for GND, and (+) is for the +15VDC connection.

**70 MHz (2) and Video (3) Input Connections:**
All input signal connections are made through clearly marked rear panel connectors. Video or composite baseband input is through a BNC jack labeled *VIDEO* (3). The 70MHz input is through a BNC jack that is labeled *70 MHz INPUT* (2). Connect a 75-Ohm coaxial cable from the video or modem source to the appropriate connector. Once power has been applied, the precise input can be selected.

**VIDEO Output Monitor (4):**
This Rear Panel connector provides an output of the program video.

**AUDIO Inputs 1-4 (6):**
Audio 1 through Audio 4 inputs are 3-pin XLR connectors on the rear panel. Connect twisted-pair shielded cables from the audio line source (or microphone cable if a microphone is used) to the audio input connectors (XLR-3). See Figure 4-11 for a detailed view and the pinouts.

**RF INTERFACE (7):**
A TNC (or Optional Triax) connector interconnects the Control Unit to the RF Head. Both the DC power and the 70 MHz are diplexed onto the center conductor.

**Remote Control Connector (8):**
The remote control allows for full control and monitoring of the NEWSCASTER VT1. This connector allows for RS232, RS422, or RS485 interfaces. Refer to Section 5.3.1 for on settings. Note all pins are not required depending on the interface used. See Figure 4-6 for a detailed view and the pinouts.

**JOYSTICK INT. (9): (Optional)**
This 5-pin connector (Optional) connects to the joystick to control the Pan & Tilt Motor. See Figure 4-8 for a detailed view and the pinouts.

**PAN / TILT POWER (10): (Optional)**
This connector (Optional) is used to provide power to the Pan & Tilt Motor. See Figures 4-9 and 4-10 for a detailed view and the pinouts.

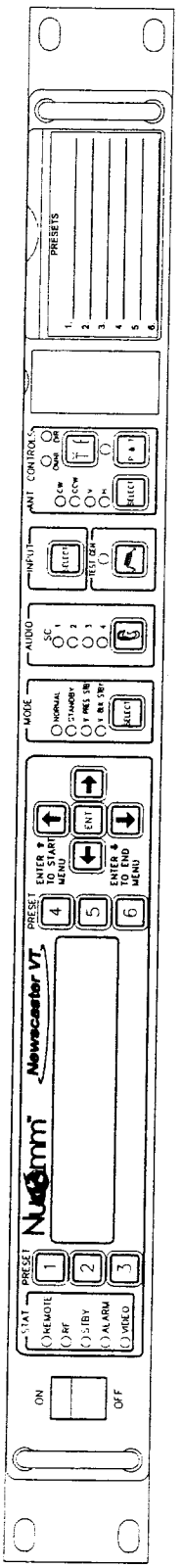



**Figure 4-3 NEWSCASTER VT1 Control Unit Front Panel**

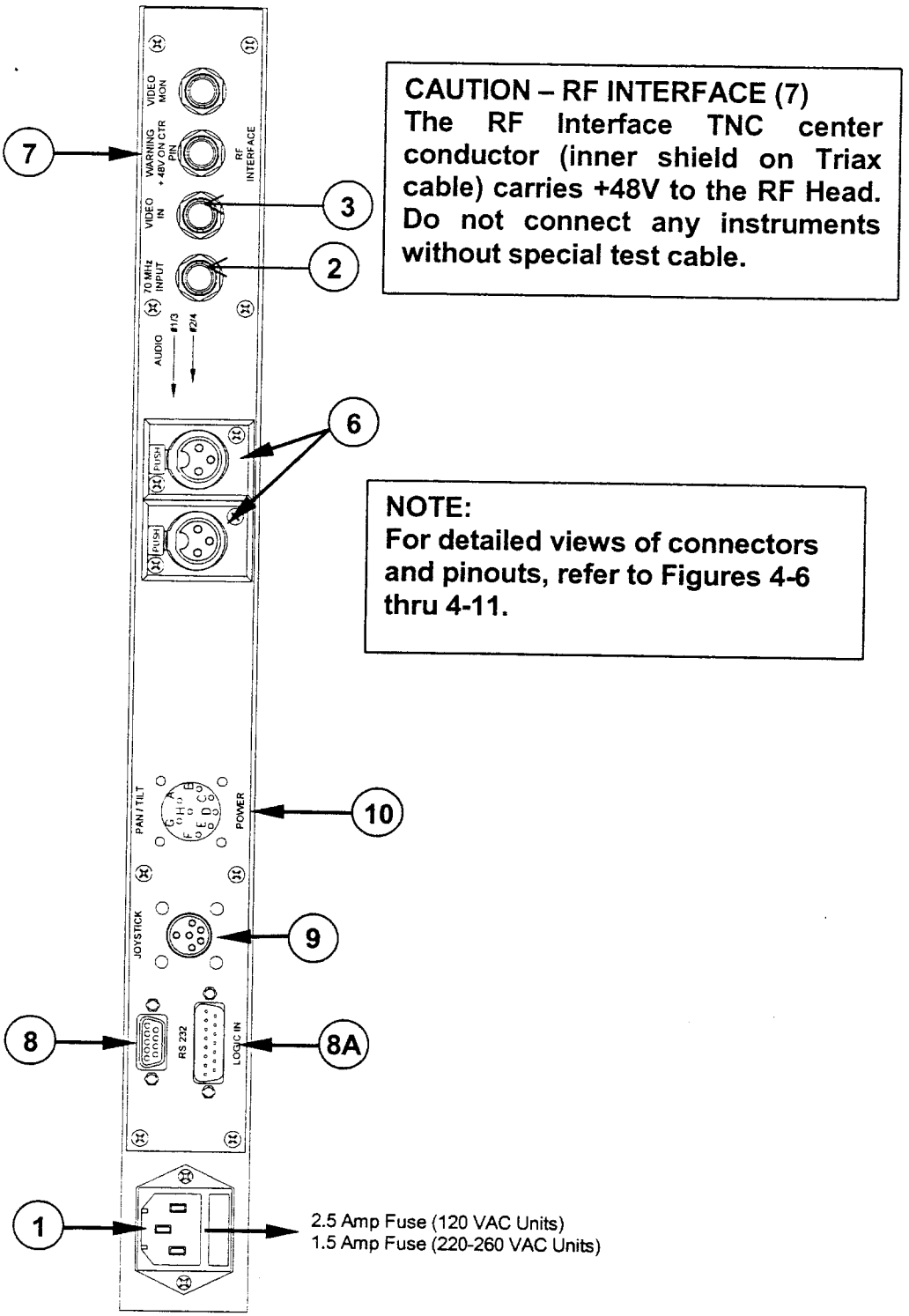
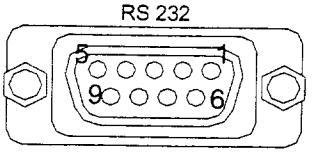


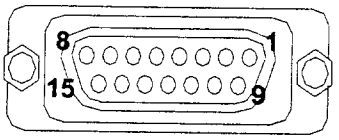

**Figure 4-4 AC Powered NEWSCASTER VT1 Control Unit Rear Panel**

RS 232




| Pin # | Function | |
|---|---|---|
| | RS232 | RS422/485 |
| 1 | N/C | N/C |
| 2 | RX/A | RX/A |
| 3 | TX/A | TX/A |
| 4 | N/C | N/C |
| 5 | GND | GND |
| 6 | N/C | TX/B |
| 7 | N/C | N/C |
| 8 | N/C | RX/B |
| 9 | +11Volts | +11Volts |

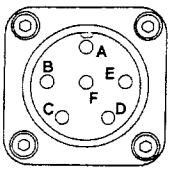
**Figure 4-5 Front View RS 232 Connector (8)**




| Pin # | Function |
|---|---|
| 1 | LOGIC #1 |
| 2 | LOGIC #2 |
| 3 | LOGIC #3 |
| 4 | LOGIC #4 |
| 5-8 | NOT USED |
| 9-15 | GND |

**Figure 4-6 Front View Logic Input Connector (8A)**

JOYSTICK

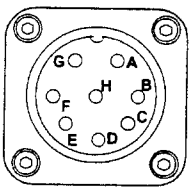



INT.

| Pin # | Function |
|---|---|
| A | +5V |
| B | Azimuth |
| C | Elevation |
| D | GND |
| E | Joystick Button (Not Used) |
| F | GND |

**Figure 4-7 Front View Joystick Connector Pinouts (9)**

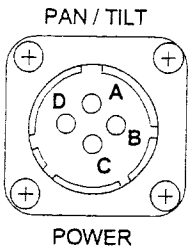
PAN / TILT




POWER

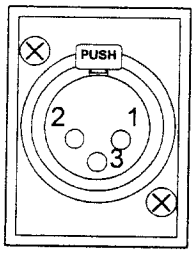
| Pin # | Function |
|---|---|
| A | +160V |
| B | +160V |
| C | NOT USED |
| D | NOT USED |
| E | –160V |
| F | –160V |
| G | GND |
| H | NOT USED |

**Figure 4-8 Pan & Tilt Power Connector (10) Front View (AC Powered Units)**




| Pin # | Function |
|---|---|
| A | +12V |
| B | +12V |
| C | GND |
| D | GND |

**Figure 4-9 Pan & Tilt Power Connector (10) Front View (DC Powered Units)**




| Pin # | Function |
|---|---|
| 1 | GND |
| 2 | +AUDIO |
| 3 | -AUDIO |

**Figure 4-10 Front View Audio Connector (6)**

### 4.10.2.RF Head

**RF INTERFACE (11):**
This TNC (or Triax) connector inputs the diplexed 70 MHz, control data, and the DC power for the RF Head.

**ANT. POL. (12):**
This connector is used to control the antenna the polarization. Both NSI and Radio Wave antennas are compatible with the RF Head. Refer to Tables 4-3 and 4-4 for connector pinouts and Figures 4-18 and 4-19 for connection diagrams.

**PAN / TILT. PWR (13):**
This connector is used to connect the Control Unit to the RF Head to provide power to the Pan and Tilt. Refer to Tables 4-1 and 4-2 for connector pinouts and functions. Refer to Figures 4-16 and 4-17 for connection diagrams.

**PAN / TILT. INT (14):**
This connects the RF Head to the Pan & Tilt unit. Refer to Tables 4-5 for connector pinouts and functions. Refer to Figure 4-20 for connection diagrams.

**RF OUTPUT (15):**
The RF output is through a Type-N connector located at the center rear of the NEWSCASTER VT1 Transmitter. Connect a 50-Ohm, low-loss coaxial cable, such as RG-214U, between the RF Output connector on the rear of the transmitter and a suitable antenna. Turn the cable connector clockwise (facing the rear of the Transmitter), while keeping it in line with the Transmitter connector. To avoid unnecessary connector wear, do not allow the cable to rotate while you connect it to the Transmitter.

**LOGIC OUT (16):**
A 15 pin male connector is provided on the NEWSCASTER VT1 RF Head for form C relay contacts. Refer to Figures 4-12 and 4-14 for connector details and pinouts.

### 4.11. RF Head Mounting

Refer to Figure 4-21 for mounting dimensions. Use four (4) size ¼-20 x .750" screws to mount the plate.

### 4.12. Pre-Installation Checkout

Connect the NEWSCASTER VT1 output through a 15-watt, 30-dB attenuator to a spectrum analyzer and observe the output frequency on the analyzer display. Note that the frequency and level correspond directly to the settings on the NEWSCASTER VT1 front panel.

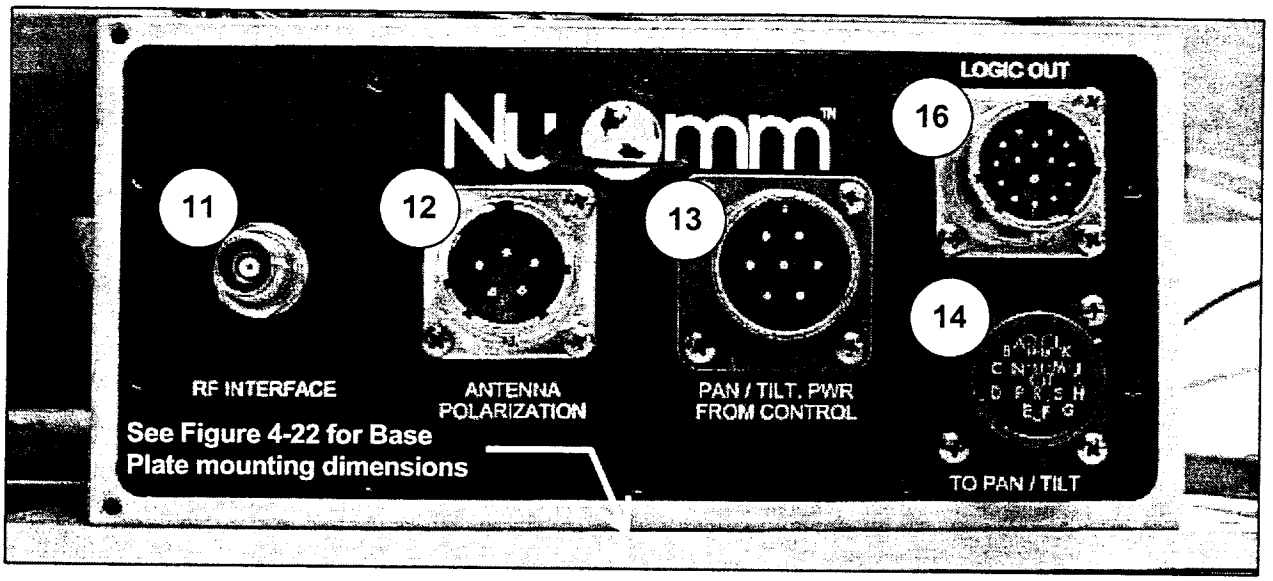



**Figure 4-11 Single-Band NEWSCASTER VT1 RF Head Connectors w/Pan & Tilt and Logic**

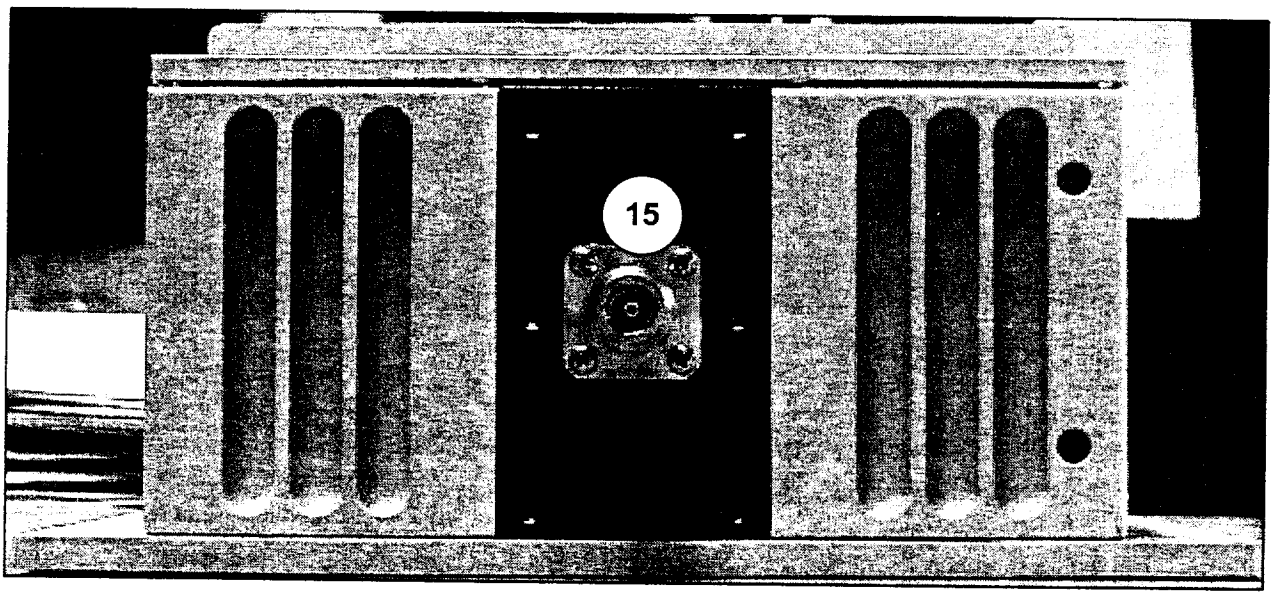
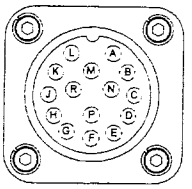



**Figure 4-12 Single-Band NEWSCASTER VT1 RF Head RF Connectors**




| CONTACT # | N.C. | N.O. | Common |
|---|---|---|---|
| 1 | A | B | C |
| 2 | D | E | F |
| 3 | G | H | J |
| 4 | K | L | M |

**NOTE:**
When Input Logic is LOW to the Control Unit, the relay contacts are in the Normally Closed state on the RF Head.

**Figure 4-13 Front View RF Head Contact Output Connector**

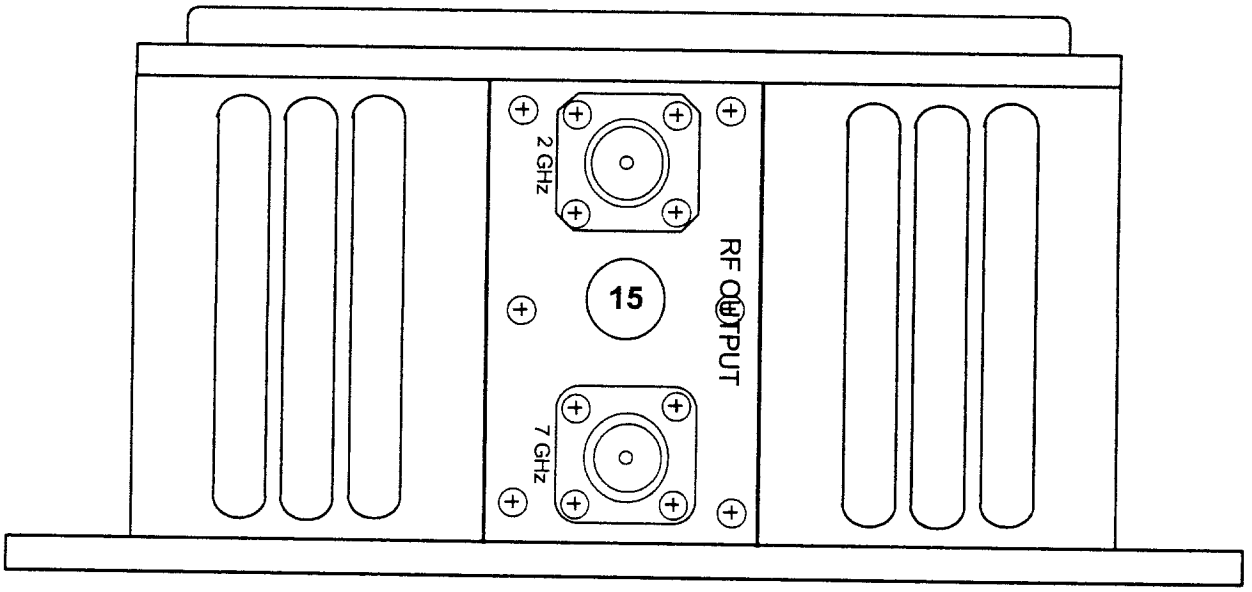



**Figure 4-14 Dual-Band NEWSCASTER VT1 RF Head RF Connectors**

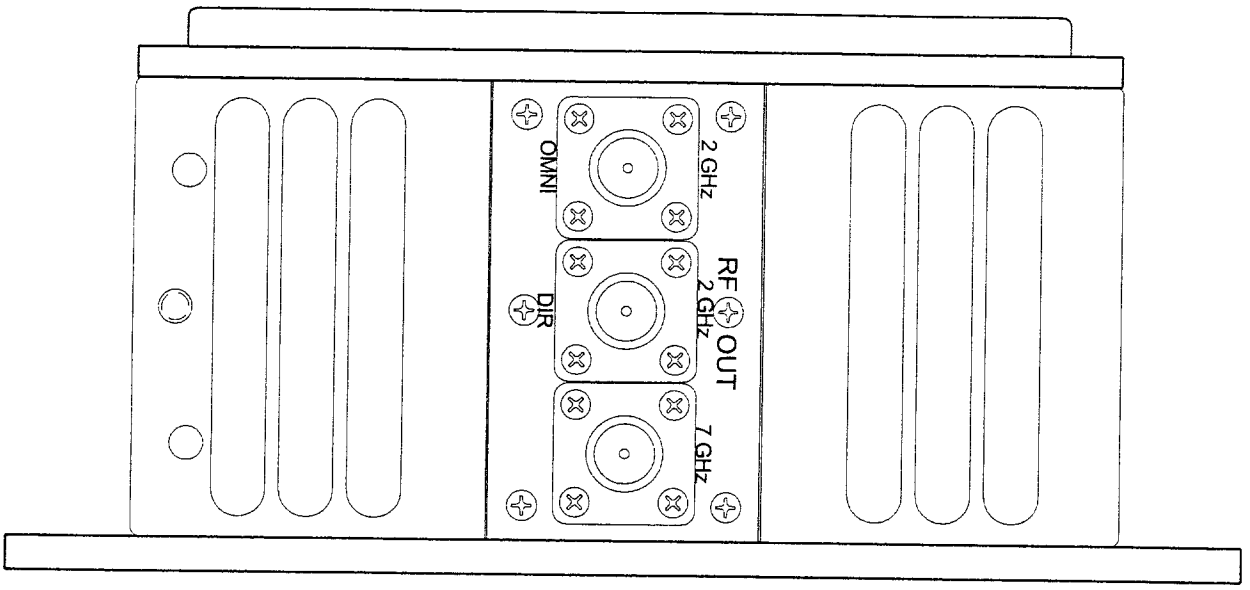



**Figure 4-15 Dual-Band NEWSCASTER VT1 RF Head RF Connectors w/Omni and Directional Antenna Outputs**

## Table 4-1Pan & Tilt Power (120VDC) Connector Pinouts

| MMPT6 Control Unit Connector Pin | Function | Recommended Wire Size (AWG) | MMPT6 RF Head Connector Pin |
|---|---|---|---|
| A | +160V | #18 White | A |
| B | +160V | #18 Red | B |
| C | Not Used | | C |
| D | Not Used | | D |
| E | –160V | #18 Brown | E |
| F | –160V | #18 Black | F |
| G | Not Used | | G |
| H | Not Used | | |

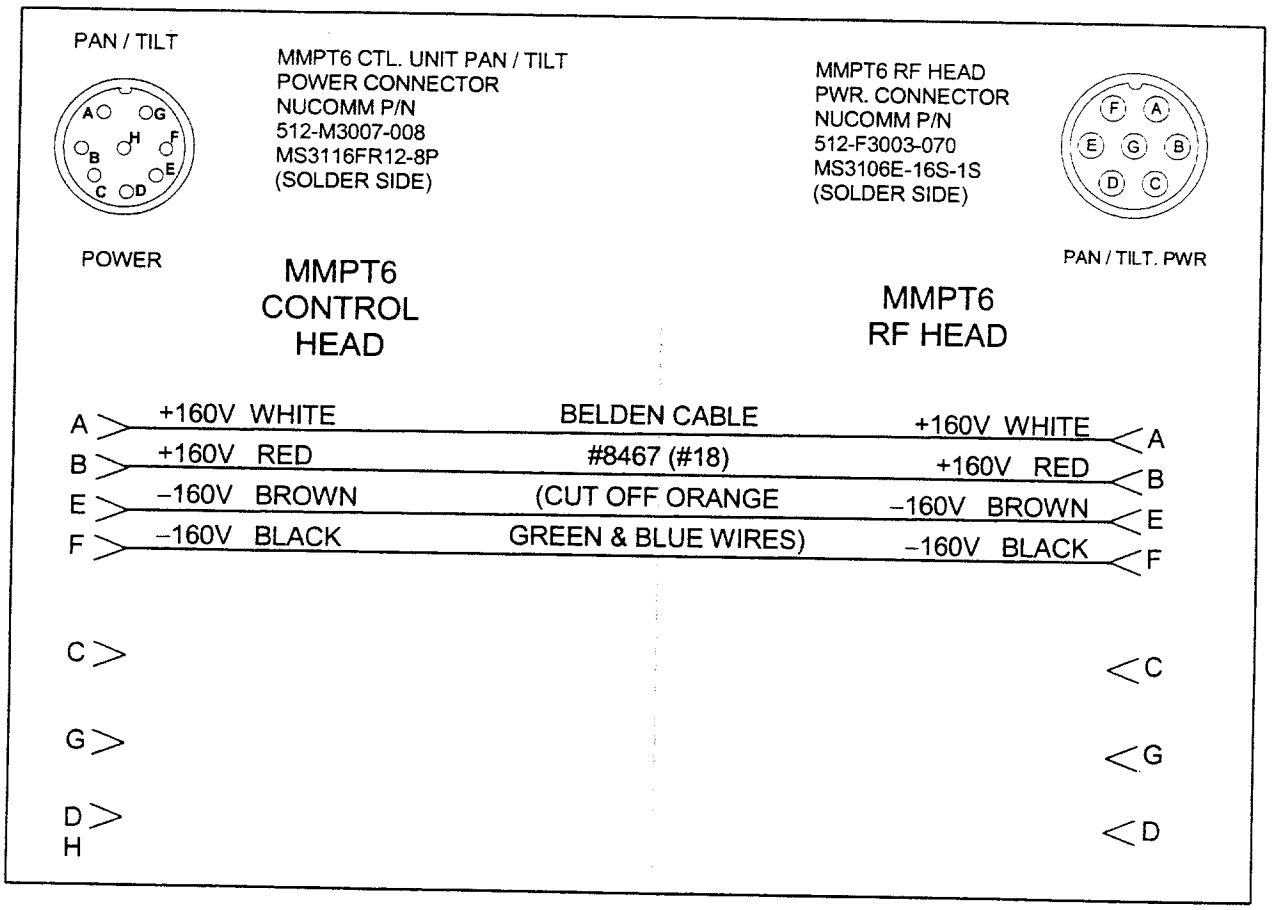



**Figure 4-16 Pan & Tilt Power (120VDC) Interconnect Diagram**

## Table 4-2 Powered Pan & Tilt Power (12VDC) Connector Pinouts

| NEWSCASTER VT1 Control Unit Connector Pin | Function | Recommended Wire Size (AWG) | NEWSCASTER VT1 RF Head Connector Pin |
|---|---|---|---|
| A | +12V | #18 YELLOW | A |
| B | +12V | #18 YELLOW | B |
| C | GND | #18 BLACK | E |
| D | GND | #18 BLACK | F |
| No Connection | Not Used | | C |
| No Connection | Not Used | | D |
| No Connection | Not Used | | G |

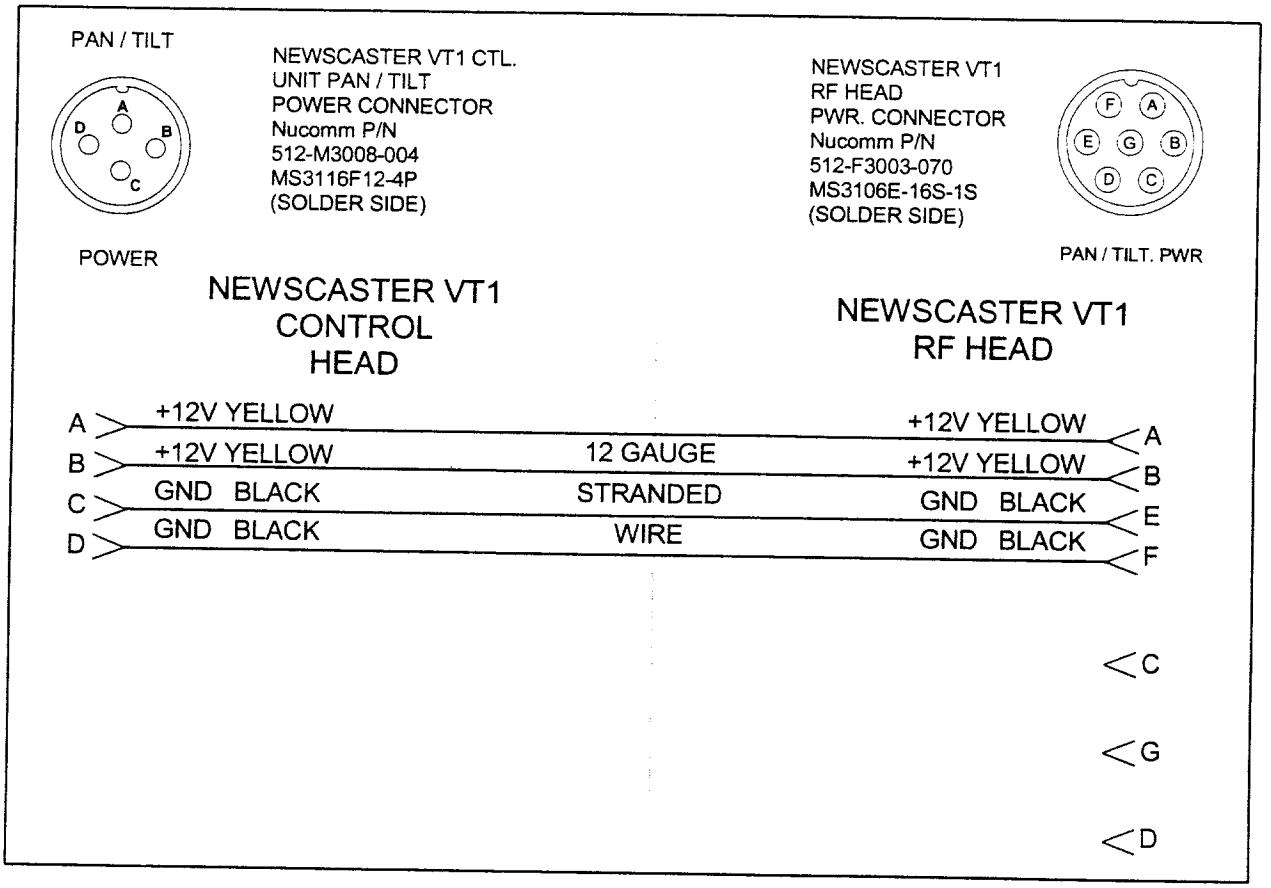



**Figure 4-17 Powered Pan & Tilt Power (12VDC) Interconnect Diagram**