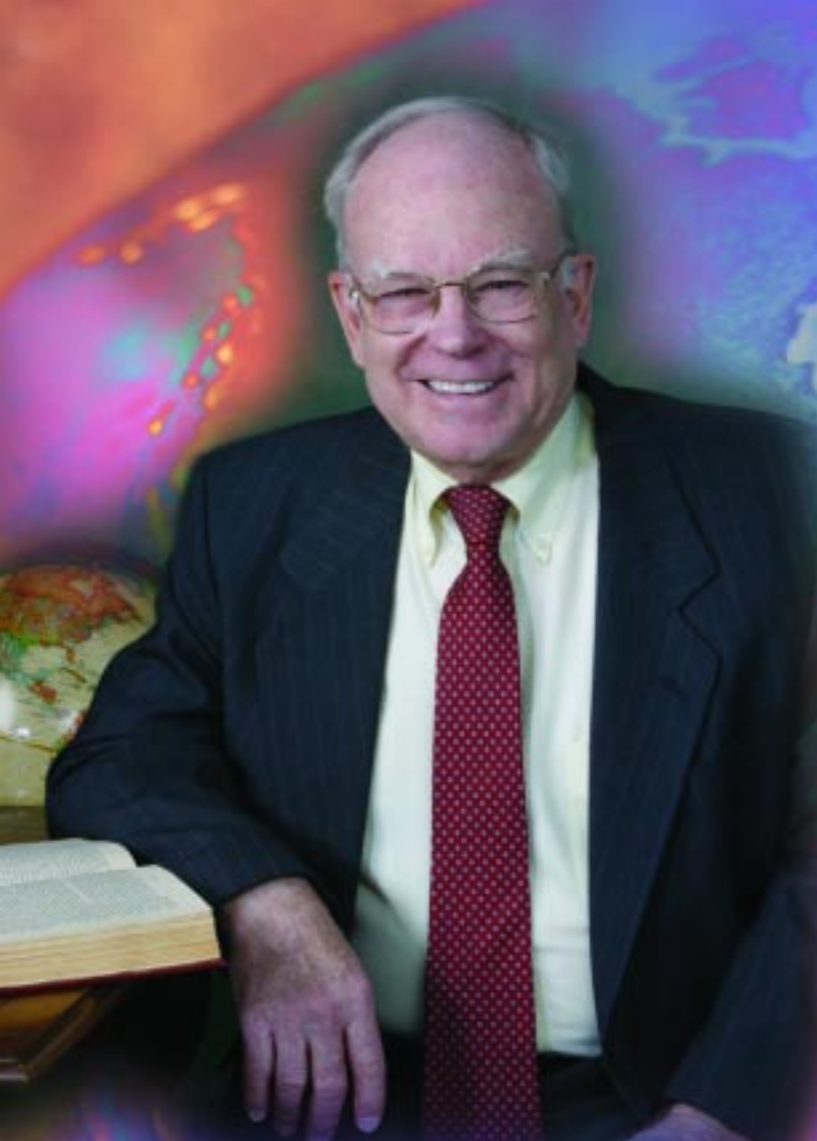


Nucomm

Microwave Solutions

for the Digital Age





INNOVATION AND FLEXIBILITY

Nucomm Inc. is a worldwide provider of digital and analog video microwave systems for the broadcast industry.

Working with leading television broadcast and government customers around the world, Nucomm has developed a comprehensive line of portable and fixed link microwave systems. A hallmark of the Nucomm products is their unmatched flexibility in supporting the migration from analog to digital transmission.

OUR MISSION

Our primary responsibility is to provide quality, world-class products that will serve our customers for years. In the words of Dr. John B. Payne, the founder and president of Nucomm, "The key to our success is in maintaining a firm commitment to our customers, the industry, and the technology."

By focusing on innovation, product quality, and customer satisfaction, Nucomm has gained a reputation as a provider of reliable, leading-edge microwave systems for broadcast, government, military, law enforcement, and homeland security applications.

A HISTORY OF ACCOMPLISHMENTS

From its inception in 1990, Nucomm has been a trendsetter in product research and development, introducing products with features, technologies, and capabilities never before offered in microwave transmitters and receivers.

- > First digital STL system and first to use 8VSB modulation in a digital microwave link
- > First to demonstrate the advantages of digital transmission for electronic newsgathering
- > Pioneered the use of microprocessor and surface mount technology in portable systems
- > First microwave transmitters and receivers to offer the advantages of multiband operation in a compact package
- > First to offer video microwave systems with built-in self-test and pattern generators

A COMPANY POISED FOR FUTURE INNOVATION

As our customers embrace the digital age, Nucomm continues to evolve as a worldwide provider of end-to-end digital systems solutions. No matter which wireless video transport requirement you have, chances are Nucomm offers an innovative system for your application:

- > Portable digital transmit and receive systems for electronic newsgathering and outside broadcast applications
- > Complete airborne microwave packages
- > Tripod mounted links
- > Wireless camera systems
- > Digital fixed link point-to-point systems for studio-to-transmitter links, intercity relays, and satellite backhaul applications

TAKE A CLOSER LOOK AT NUCOMM

After reviewing the summary descriptions in this product guide, please call or email us for more information. And, when you can, please visit our modern design and manufacturing facility in Hackettstown, New Jersey, just 60 miles west of New York City, near Interstate 80.

When planning your next microwave system or accessory purchase, do what a growing list of users do worldwide. Look to the Nucomm team for microwave solutions for the digital age.

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MICROWAVE SOLUTIONS FOR THE DIGITAL AGE

TECHNICAL SERVICES

The road to customer satisfaction begins with the ability to provide complete and responsive solutions. Whether your needs include a new path, an upgrade, an add-on, or a replacement, Nucomm is ready to assist you with a comprehensive array of system engineering, manufacturing and integration services.

Examples of our best-in-class solutions include:

- > Studio to Transmitter Links — Nucomm can provide a flexible variety of analog and digital systems as well as our Dual Stream composite systems to support NTSC/PAL and DVB-T/ATSC transmission.
- > Intercity Relay Systems — In multi-hop applications, the ultra-linear characteristics of Nucomm's FT6/FR6 radios have always provided undistorted analog transmission, and easily support digital transmission at data rates to 140 Mbps.
- > ENG/OB Systems — Nucomm pioneered in the microwave uses of COFDM. Our Newscoder portables, SkyMaster airborne, and central receive products get the story, on the move, without annoying break-up.
- > Digital Upgrades — Nucomm has developed a broad array of products that can extend the life of existing analog systems, and augment the capability of digital systems.

To complement our comprehensive line of digital products, Nucomm offers an equally broad range of technical services:

- > Complete path and system design
- > Total system integration
- > Turn-key installation
- > System commissioning, check-out and proof of performance
- > Training courses at Nucomm or at customer locations

After the sale, you can rely on 24/7 support, 365 days a year. Our fully equipped and staffed service department offers fast turn around for equipment in need of repair.

Nucomm is proud to offer customer support that is second to none in the industry. All service items are thoroughly burned in and undergo temperature cycling and rigorous end-to-end testing prior to shipment. Technical people are available any time for telephone consultation and assistance.

Visit our website for more information or contact our customer service department.

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FT6/FR6

Digital/Analog (Digalog) Microwave Link



The FT6/FR6 Digalog radio is a digital/analog microwave transmitter and receiver pair that operates in bands from 1.3 to 15.4 GHz. The FT6/FR6 is designed to transport both analog and digital signals to 120 Mbps with a flip of a switch. The basic unit accepts 70 MHz input from either a digital or an analog modulator with modulation formats such as FM, VSB, QPSK, 16QAM to 128QAM, ATSC and COFDM. Optionally available is an integrated 70 MHz analog video modulator and demodulator with up to six audio subcarriers. For digital operation a wide variety of digital modems are available, such as the V-Stream II 8VSB Modem, MM200 Multi-Rate Modem with rates to 120 Mbps, and DS3 Modem with rates to 45 Mbps.



*FT6 Transmitter and 8VSB Modem
(For self-contained system see the V-Stream
on page 5)*

FEATURES:

- Digital performance to 120 Mbps
- Supports FM, VSB, QPSK, 16QAM to 128QAM, ATSC and COFDM
- One switch changes from analog to digital
- Digital/analog—no retuning or changing modules
- Ultra low phase-noise sources
- Low-noise, high dynamic LNA with AGC
- Split chassis for easy maintenance
- Monitor and alarm interface
- Simplex, duplex, and hot standby

OPTIONS:

- Up to six audio subcarriers
- Space diversity with error-free seamless switch
- Systems design, integration, and commissioning



High Power Amplifier (see page 6)



*FT6 Transmitter and MM200 Multi-Rate Modem
offers digital transport up to 120 Mbps (see page 8)*

SEAMLESS SWITCHING

Error-free Seamless Switching

As an option, Nucomm offers seamless error-free switching on all hot standby and diversity receive systems. In conventional hot standby receive systems, switching the output from one receiver to the other can cause an interruption of the signal for a few milliseconds. In a digital STL system, any interruption in data flow, for even a microsecond, means the loss of considerable data. In a digital video system, such as high definition, the loss of data for even a microsecond will cause the demodulator to lose lock for up to several seconds causing the picture to freeze or tile.

In Nucomm's hot standby and diversity receive systems, error-free seamless switch monitors each digital receive signal path for errors.

Errors can occur due to signal fades, multi-path effects, interference or equipment malfunctions. If an error is detected from one receiver the system automatically switches and receives data from the other receiver. The system switches instantaneously so as not to lose any data. Data from each hot-standby receiver modem must first be adjusted so that all bits are aligned and synchronized. The data packet from each path is monitored to detect the occurrence of an error. The output switch then selects the error-free packet path. Switching from one data path to the other occurs within a single data bit. Switching is performed before de-multiplexing. This provides for error-free switching of the wayside channel as well as the high data rate signal.

DUAL STREAM

Dual Carrier STL System



Nucomm's Dual Stream HDTV STL System is designed specifically for the television broadcaster. This highly reliable, flexible, and cost-effective DTV STL system is ideal when a second RF STL channel is not available. The Dual Stream system transports the ATSC 19.39 Mbs data stream, an analog NTSC signal and a T1 Data Pack within a 25 MHz RF channel. The T1 Data Pack includes a T1, two RS-232, eight logic inputs, four logic and four form C relay outputs. The system is available for both the 7 and 13 GHz bands.

The Dual Stream STL system eliminates the need for digitizing and encoding the NTSC signal using expensive encoders. Since the NTSC signal is not encoded to a digital signal, it does not have latency. In addition, all VITs line and control subcarriers are not altered or affected.

The Dual Stream system consists of two separate radios, constructed in separate cases for easy redeployment when NTSC transmission is no longer required. The field proven FT6/FR6 series Digalog transmitter and receiver carry the analog video and audio which occupies 2RU (non-redundant). The ATSC digital signal is transported using Nucomm's innovative, state-of-the-art 8VSB digital microwave transmitter and receiver, which occupies 1RU (non-redundant). The RF output from each transmitter is combined to feed a single antenna. Alternately, each RF output could feed a dual polarized antenna.

Nucomm has selected 8VSB as the preferred modulation format for the digital section of the Dual Stream system. The 8VSB format offers several significant advantages over other modulation formats, particularly in a dual carrier STL system. The spectral efficiency of 8VSB leaves more bandwidth available for the NTSC and Audio Subcarriers. (Nucomm can add up to six subcarriers to the analog section). The 8VSB chipsets contain far more forward error correction and equalization than is possible using other modulation formats. The forward error correction and equalization automatically adjust to adapt to local conditions. *The 8VSB format offers the best possible link performance in a dual carrier system.*

Nucomm has taken advantage of its 8VSB experience and has added a channel 3 or 4, 8VSB RF output from the 8VSB receiver. When connected to a HD set-top box or professional receiver, the output enables one to display the actual HD picture being received over the microwave link.

The FT6/FR6 is at the core of Nucomm's open architecture STL platform. A key advantage of the Dual Stream system is that existing FT6/FR6 radios already in the field can be upgraded for Dual Stream operation with the addition of the 8VSB transmitter and receiver. When NTSC no longer exists, the FT6/FR6 can be reconfigured to an all digital system to carry additional ATSC signals or higher data rate signals such as DS3 or with the MT200 Multi-Rate Modem with rates to 140 Mbps. This second digital system can easily be moved to a

FEATURES:

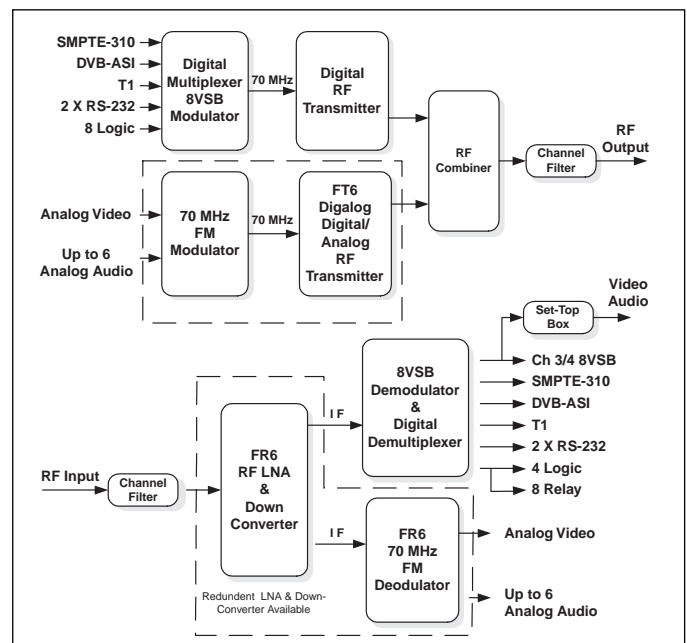
- NTSC and the 19.39 Mbps ATSC data stream, both transported within a 25 MHz RF channel
- 8VSB modulation for spectral efficiency and improved robustness over 16QAM
- De-jittered receiver output: SMPTE-310M and DVB-ASI
- Up to six audio subcarriers
- T1 Data Pack includes: T1, two RS-232, eight logic inputs, four logic and four form C relay outputs
- Ch 3 or 4, 8VSB output enables HD video/audio to be monitored on a set-top box
- Multiple interfaces: both SMPTE-310M and DVB-ASI
- Optimized forward error correction: Reed-Solomon and Viterbi
- Advanced adaptive equalization
- Open architecture platform for easy reconfiguration to other HDTV STL systems
- Configurable for simplex, duplex, hot standby and space diversity with error-free seamless switching

OPTIONS:

- HD video monitor (set-top box)
- Upgradable to dual digital or DS3 system

different location. To use the FT6/FR6 radio for digital, Nucomm offers several digital modems including the Analog Coder, the MM200 Multi-Rate Modem (to 140 Mbps), DS3 Modem (to 45 Mbps), or the Flexi-Mod.

The Dual Stream system is designed for easy integration and service with a split chassis design of the analog section that provides easy access to all internal modules. The Dual Stream can be configured for simplex and/or duplex. In addition, several protection configurations are available such as hot standby redundancy, space diversity, and error-free seamless switching.



V-STREAM II

Low Cost ATSC STL System with Variable Data Rates from 1 to 25 Mbps



The V-Stream II, an ATSC digital microwave STL system using advanced 8VSB modulation, now accepts any input data rate from 1 to 25 Mbps. It is a lower-cost STL alternative for the television broadcaster, available in bands from 1.3 to 15.4 GHz. The V-Stream II system transports the ATSC 19.39 Mbps data stream plus a T1 Data Pack within a 7.5 MHz bandwidth; in addition the input data rate is automatically variable from 1 to 25 Mbps. The transmitter auto selects between SMPTE-310M and DVB-ASI inputs, while the receiver is configured with two SMPTE-310M & one DVB-ASI outputs. The receiver also offers a channel 3 or 4, 8VSB RF output that enables one to display the actual HD picture being received over the microwave link. A T1 Data Pack is standard and includes a T1, two RS-232, eight logic inputs, four logic and four form C relay outputs. The V-Stream II also offers an optional integrated input multiplexer/demultiplexer.

FEATURES:

- Data rates variable from 1 to 25 Mbps
- The 8VSB advantages:
 - Optimized forward error correction
 - Advanced adaptive equalization
 - Performs well over long paths
 - Has monitoring capability—DTV and bit error rate
 - 7.5 MHz spectral efficiency
 - Improved fade margins
- Multiple interfaces: both SMPTE-310M and DVB-ASI
- De-jittered receiver output: SMPTE-310M and DVB-ASI
- T1 Data Pack includes: T1, two x RS-232, eight logic inputs, four logic and four form C relay outputs
- Performance monitoring via RS-232

OPTIONS:

- Integrated multiple input multiplexer/demultiplexer
- DC or universal power supplies
- Error-free seamless diversity receive switch
- HD video monitor (set-top box)

DIGITAL MICROWAVE LINK

DML

DS3 Microwave Link Variable Data Rate to 45 Mbps



Nucomm's DML Series STL microwave system is designed to transport MPEG2 digital data up to 45 Mbps in bands from 1.3 to 15.4 GHz. The data rate is field adjustable including, but not limited to DS3, E3 and ATSC applications. This system is a combination of the field proven, FT6/FR6 series transmitter/receiver along with Nucomm's variable rate digital modulator/demodulator technology integrated into a single 2RU rack slide-out drawer. The DS3 System is controllable via a PC through a RS-232 interface.

FEATURES:

- Variable data rates to 45 Mbps including ATSC, E3, and DS3
- Interfaces: G.703, DVB-ASI, SMPTE-310M
- De-jittered outputs
- Forward error correction
- Adaptive equalization
- DS3 fits in 17 or 25 MHz channel plans
- Self-contained in 2 rack unit
- RS-232 performance monitoring includes packet errors and signal quality

OPTIONS:

- Hot standby, space diversity with seamless error-free switching
- Simplex or duplex operation

HIGH POWER AMPLIFIER

Analog or Digital to 15 GHz, 5 to 20 Watts



Nucomm's High Power Amplifiers are designed specifically for both digital and analog applications where additional output power is required. The HPA is available in bands from 1.3 to 15.4 GHz with typical gains of 5 to 10 dB. Output power for analog applications is from 10 to 20 watts depending on the frequency. For digital applications the power is reduced by 3 to 10 dB, depending on modulation format.

FEATURES:

- Increase link fade margins over long paths
- Easy integration into existing waveguide systems
- Front panel meter monitors output power
- 19" Rack mounting

OPTIONS:

- Higher gains
- Dual hot standby operation
- Universal AC/DC power supply optional

RF REPEATER

On-Channel RF Repeater—Analog or Digital in Bands from 1.3 to 15.4 GHz



Nucomm's active RF Repeater offers a low-cost alternative to the heterodyne IF repeater in special situations. The RF Repeater is a high gain amplifier and channel filter that can receive a low-level RF signal from a receive antenna, amplify it to the required output power, and then retransmit it through another antenna at the same frequency.

FEATURES:

- Cost-effective multi-hop repeater
- Minimal waveguide
- Tower mounted weatherproof enclosure
- 1 to 10 watts output power
- Hot standby configurations
- Channel filtering
- Digital and analog applications

FIXED LINK ANTENNAS AND ACCESSORIES

Nucomm offers a complete range of antenna, coaxial cable, waveguide and hardware products for fixed tower mounting applications. Please contact Nucomm for a detailed quotation specific to your application.

ACCESSORIES:

- High gain directional antennas
- Waveguide and accessories
- Other specialty antennas available upon request

FT5/FR5

Analog Link Radios; STL, TSL & ICR Direct Modulation



The FT5/FR5 analog radios are designed to deliver television broadcast quality audio and video in bands from 1.3 to 15.4 GHz. The applications include Studio to Transmitter Links (STL), Transmitter to Studio Links (TSL) and Inter-City Relays (ICR). The equipment can be configured for single hop, multi-hop, simplex or duplex requirements as well as hot standby and space diversity. The FT5 is available in a variety of power output configurations.

FEATURES:

- In bands from 1.3 to 15.4 GHz
- Improved remodulation design
- Integrated modulator and demodulator
- Up to 6 field programmable audio channels available
- PAL or NTSC compatible
- High MTBF through the use of surface mount technology and ASIC technology
- 2RU high
- Slide-out works-in-a-drawer design
- High output power available
- Universal AC/DC power supply optional

FMT4/FMR4

Analog 70 MHz FM Modulator/Demodulator



Nucomm's series FMT4/FMR4 is a family of self-contained rack-mounted baseband or 70 MHz modulators and demodulators that provide the baseband interface for audio and video to and from baseband or 70 MHz. Up to three complete FM modulators or demodulators can be integrated into a two vertical rack space drawer (3.5", 8.89 cm). An EIA/CCIR video emphasis/de-emphasis network is included in each unit. This network can be bypassed to provide a flat video response if desired. Any power requirement can be met including a universal AC/DC power supply. Up to six field programmable synthesized FM audio subcarriers can be integrated into each FM modulator and demodulator. Each audio subcarrier frequency is independently field tuneable by internal dip switches to any frequency in 5 kHz steps.

FEATURES:

- From 1 to 3 FM modulators or demodulators per drawer
- Complete system diagnostics
- Up to six synthesized FM audio subcarriers, field programmable
- EIA/CCIR Video with low-pass filter
- Clamped output standard on demodulator

OPTIONS:

- Video presence detector
- Built-in test generator with color bar and ID



MM200 MULTI-RATE MODEM

High Speed Applications with Data Rates to 200 Mbps



This innovative and highly flexible modem is configurable for data rates between 1 and 200 Mbps. The unit allows complete control over modulation density and channel bandwidth for efficiencies up to 6 bits per second per Hz. The unique architecture of the MM200's IF allows large improvements to fading and multi-path via multiple digital equalizers when used with the Nucomm FT6/FR6 microwave transmitter and receiver. The MM200 is an ideal solution for both new and retrofit microwave link installations. Maximum flexibility is achieved by an internal data multiplexer that combines up to four user selectable data paths into a single data stream. The IF can be field-configured with 1 to 4 channels providing total flexibility. Each channel can operate up to 7 Mbaud.

FEATURES:

- Up to four user-selectable data/overhead interfaces
- 4, 16, 32, 64, 128 and 256QAM operation
- Seamless hot standby switching
- Reed-Solomon forward error correction
- Adaptive equalization
- Remote control from network or serial interface
- Companion to Nucomm's FT6/FR6 microwave system

INTERFACES:

- G.703 DS3, E3 or STS-1, DVB-ASI, SMPTE-310M
- RS422 parallel, DVB parallel, MP2P
- LVDS parallel, DVB parallel
- T1/E1 wayside
- 10 base T
- OC3 optical, STM1/ STS3

ANALOG CODER II

Converts an Analog Link into a Digital Link



The Analog Coder II, a cost-effective solution for upgrading an existing analog microwave link to handle a variety of digital signals, now accepts input data rates from 1 to 25 Mbps. Signals such as the ATSC 19.39 Mbps data stream plus a T1 Data Pack can be transmitted without any loss in signal quality. The inputs and outputs are DVB-ASI and SMPTE-310M. The demodulator outputs a channel 3 or 4, 8VSB RF signal that provides for displaying and monitoring of the HD picture being sent over the microwave link. Optional features include an integrated multiple input multiplexer/demultiplexer, and the simultaneous transmission of up to six audio subcarriers along with the digital signal. The Analog Coder II is ideal for single or multi-hop links. HDTV signals have been transported through a 24-hop repeater system using the Analog Coder II without any degradation in signal or picture quality.

FEATURES:

- Variable data rates from 1 to 25 Mbps
- Integrated multiple input multiplexer/demultiplexer optional
- No retro-fit of existing STL required
- Excellent for multi-hop systems
- Multiple interfaces: both SMPTE-310M and DVB-ASI
- FEC includes Viterbi, Reed-Solomon, Interleaving
- Adaptive equalization
- De-jittered SMPTE-310M and DVB-ASI outputs
- T1 Data Pack includes: T1, 2 x RS-232, eight logic inputs, four logic and four form C relay outputs
- Higher output power than digital radios
- Ch 3 or 4, 8VSB output is standard
- RS-232 performance monitoring includes packet errors and signal quality
- HD monitor (set-top box) optional
- Universal AC/DC power supply optional
- Audio subcarrier option

ADVANTAGES:

- Uses existing analog infrastructure
- No modification to existing radios required

V-STREAM II 8VSB IF MODULATOR/DEMULATOR

Variable Data Rates from 1 to 25 Mbps



The V-Stream II 8VSB IF Modulator/Demodulator now accepts any input data rate from 1 to 25 Mbps (including ATSC 19.39 Mbps plus a T1 Data Pack) and outputs a 7.5 MHz bandwidth 70 MHz RF signal using advanced 8VSB modulation. The V-Stream II 8VSB Mod/Demod is a stand-alone product in a 1RU chassis. When combined with an existing digital-ready STL such as the Nucomm FT6/FR6 series, the V-Stream II 8VSB Mod/Demod provides a fully functional digital link for transporting such digital signals as the ATSC 19.39 HDTV. The system is data rate insensitive; that is, the system automatically senses input data rate from 1 to 25 Mbps. The Demodulator also provides a switchable channel 3 or 4, 8VSB RF output that provides for display and monitoring of the HD picture being sent over the microwave link. The V-Stream II 8VSB IF Mod/Demod also offers an optional integrated input multiplexer/demultiplexer

FEATURES:

- Variable data rates from 1 to 25 Mbps
- Integrated multiple input multiplexer/demultiplexer optional
- The 8VSB advantages:
 - Optimized forward error correction
 - Advanced adaptive equalization
 - Performs well over long paths and multiple hops
 - Monitoring capability – DTV and bit error rate
 - 7.5 MHz spectral efficiency
 - Improved fade margins
- Multiple interfaces: both SMPTE-310M and DVB-ASI
 - TX input automatically detects SMPTE-310M or DVB-ASI
 - RX output – (2) SMPTE-310M, (1) DVB-ASI
- De-jittered receiver output: SMPTE-310M and DVB-ASI
- T1 Data Pack includes: T1, 2 x RS-232, eight logic inputs, four logic and four relay outputs
- RS-232 performance monitoring includes packet errors and signal quality
- Universal AC/DC power supply optional
- HD video monitor (set-top box) optional

FLEXI-MOD/DEMOM

70 MHz Modulator/Demodulator; Variable Data Rate to 45 Mbps



Nucomm's Flexi-Mod is a 70 MHz modulator/demodulator designed to transport MPEG2 digital data up to 45 Mbps. The data rate is field adjustable including, but not limited to, DS3, E3 and ATSC applications. Each unit is housed in a single 1RU rack unit. Forward error correction using Reed-Solomon, Viterbi and interleaving along with adaptive equalization are provided to help overcome frequency selective multi-path and adverse environmental conditions. The Flexi-Mod is controllable via a PC through a RS-232 interface.

FEATURES:

- 70 MHz input/output
- Variable data rates including, ATSC, E3 and DS3
- Interfaces: G.703, DVB-ASI, SMPTE-310M
- De-jittered outputs
- Forward error correction
- Adaptive equalization
- DS3 fits in 17 or 25 MHz channel plans
- Self-contained in 1 rack unit
- AC power supply

OPTIONS:

- Universal AC/DC power supply
- Other interfaces available

DIGI-MUX MULTIPLEXER

Enables HDTV and NTSC Signals to be Transmitted Over a Single Microwave Channel



The Digi-Mux is a totally digital solution for sending one NTSC video/audio and one HDTV signal over a single microwave channel. The Digi-Mux Multiplexer/demultiplexer accepts an analog NTSC video and a digital ATSC 19.39 Mbps. With an external MPEG2 encoder, the analog signal is digitized and compressed to a rate of about 15 Mbps. The compressed signal is combined with the ATSC 19.39 Mbps signal into a single MPEG2 transport stream at about 35 Mbps and is transmitted over a single microwave channel. At the receiver end, the analog signal is decoded and outputted in its original analog form. The ATSC 19.39 Mbps digital signal is outputted as both a SMPTE-310M and DVB-ASI format for direct connection to the HDTV transmitter.

FEATURES:

- SMPTE-310M, DVB-ASI plus other interfaces available
- Transmits analog NTSC/PAL with ATSC over a single channel
- Companion to Nucomm's FT6/FR6 microwave system
- Forward error correction
- De-jittered ATSC output
- Fits in 25 MHz channel plans
- 70 MHz output/input
- Expandable to three or more channels

OPTIONS:

- Hot standby
- Seamless switching

M2-ENCODER-1

Rack-Mounted MPEG2 Encoder



The Nucomm's M2-Encoder-1 is a lightweight and versatile MPEG2 video encoder. The M2-Encoder-1 is housed in a 1RU case. The M2-Encoder-1 has a self-contained power supply that accepts 100 to 260 VAC. An optional universal AC/DC power supply is available. Applications include fixed, portable and mobile systems such as STL, ENG airborne and satellite.

FEATURES:

- Inputs:
 - Composite, Component, ASI and SDI
 - Audio: 2 Analog, 1 AES/EBU
- Output:
 - DVB-ASI and SDI
- 4:2:0/4:2:2 encoding
- PAL and NTSC compatible
- RS-232 remote control and monitoring
- Three preset quick keys
- Data Rates front panel selectable to 50 Mbps
- Internal or external clock
- Optional color bars with ID

M2-DECODER-1

Rack-Mounted MPEG2 Decoder



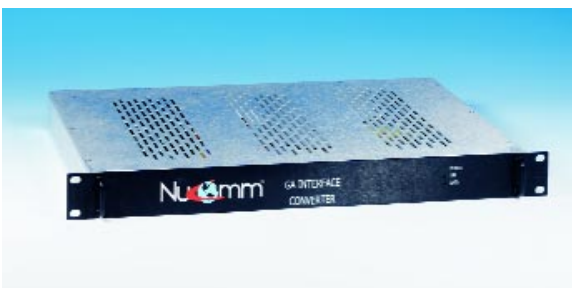
The Nucomm M2-Decoder-1 is a lightweight and versatile MPEG2 video decoder. The M2-Decoder-1 is housed in a 1RU case. The M2-Decoder-1 has a self-contained power supply that accepts 100 to 260 VAC. An optional universal AD/DC power supply is available. Applications include fixed, portable and mobile systems such as STL, ENG airborne and satellite.

FEATURES:

- Inputs:
 - DVB-ASI and SDI
- Outputs:
 - Video: composite, component, ASI and SDI
 - Audio: 2 Analog, 1 AES/EBU
- 4:2:0/4:2:2 decoding
- PAL and NTSC compatible
- RS-232 remote control and monitoring
- Three preset quick keys
- Accepts input data rates to 50 Mbps

GA LINK

MPEG2 Interface Converter for DTV



The GA Link solves system interface problems such as connecting the output of a HDTV encoder that only provides a DVB-ASI output to the input of a HDTV Transmitter that only accepts SMPTE-310M. The GA-Link is the generic name for an MPEG 2 interface converter box that is custom configured to each customer specification such as

INTERFACES:

- DVB-ASI to SMPTE-310M
- SMPTE-310M to DVB-ASI
- Serial ECL to SMPTE-310M
- Serial TTL to SMPTE-310M
- DVB parallel/ECL to DVB parallel/LVDS
- DVB parallel/LVDS to DVB parallel/ECL
- Other interfaces available
- Rate conversion
- 19.39 Mbps locked to 10 MHz GPS

DVB-ASI to SMPTE-310M. A broad range of configurations is available from a library of designs.

NEWSCASTER VT1

Digital/Analog ENG/OB Van Transmitter; Single and Dual Band Units Covering 1.3 to 15.4 GHz



*Newscaster VT1
Digital/Analog ENG/OB Van Transmitter*



*Newscoder TX1 (optional)
COFDM/MPEG2 Modulator/Encoder*

The Newscaster VT1 Series vehicle-mounted, digital /analog COFDM transmitters are ideal for the transition to digital operation. The transmitter is switchable between digital and analog modes with a built-in analog modulator. Single or dual band operation from a single RF head reduces cost, weight and complexity. Typical dual band operation is the 2 + 7 GHz RF Head. The NYCOIL assembly is significantly simplified by the use of a single coax cable connecting the control unit and RF head. The RF head voltage, 70 MHz signal and all control and monitoring go through this single coax or triaxial cable.

COFDM digital modulation is available with an external 1RU COFDM/MPEG2 modulator/encoder, the Newscoder TX1. An ultra low-noise synthesizer provides superior performance when using COFDM or other modulation formats. The front panel *Smart Display* and internal microprocessor controls and monitors all functions and parameters of the transmitter including channel/frequency selection, RF power levels, audio subcarrier frequency programming, switches between analog and digital, color bar selection, etc.

There are two modes by which frequency selection can be made in the field: channel preset selection or manual frequency selection in 250 kHz increments. The channel preset plan is field programmable from the front panel. To change channels, simply select the desired channel number. In the manual frequency setting mode, the desired frequency is entered in the front panel display. In the analog mode, the subcarrier frequencies are field tunable. To further simplify operation of the Newscaster, six preset buttons are provided on the front panel. Other front panel select buttons include the Antenna Polarization selection, Directional/Omni selection, Pan and Tilt on/off, Subcarrier, and Standby selection.

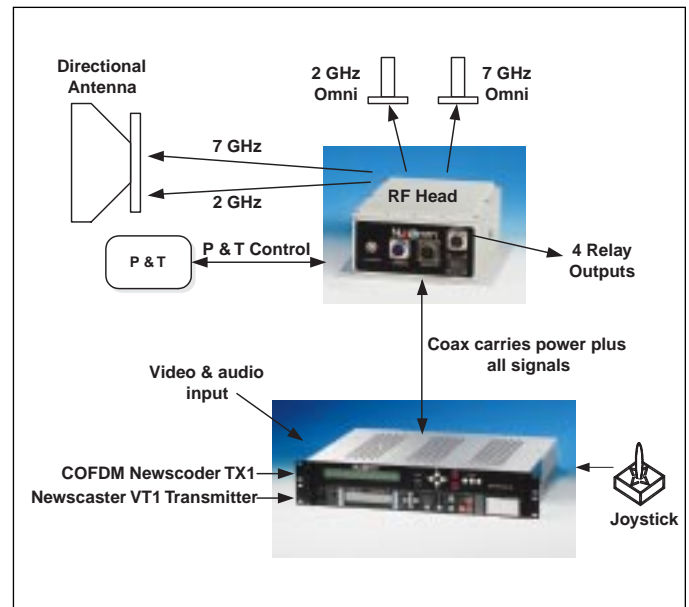
FEATURES:

- Easy to operate
- Digital or analog transmission including COFDM
- Directional/omni antenna and polarity switch are integrated into the RF head as a standard feature
- Frequency agile: via preset channels or tunable in 250 kHz step sizes
- Front panel "smart display," controls and monitors all radio functions and parameters
- Six quick keys switch between preset parameters
- Single coaxial/triaxial cable between control and RF units
- Remote control of all functions via RS-232
- Ultra low-noise synthesizer
- Field adjustable audio subcarriers

OPTIONS:

- Internal test generator with color bars and ID
- COFDM/MPEG2 modulator via the Nucomm Newscoder TX1
- Controls built-in pan and tilt with joystick

Options include a pan and tilt controller, built into the RF head with the joystick attached to the control unit. The steering signals are communicated through microprocessors that communicate through the coax cable, thus greatly simplifying the NYCOIL. Other options include a test-pattern generator plus 16-character ID, and four form C relay closure outputs from the RF head that are controlled by four logic inputs to the control unit. These relay outputs can be used to turn on lights, control a mast mount camera, etc.



*Dual Band Newscaster VT1 Transmitter plus
COFDM Newscoder TX1 Modulator*

NEWSCODER TX1

COFDM Modulator and MPEG2 Encoder



The Newscoder TX1 Series 70 MHz COFDM Modulator and MPEG2 Encoder is designed specifically for the ENG/OB Television Broadcaster. This lightweight, versatile encoder and modulator is housed in a 1RU chassis. The TX1 is ideal as a companion for ENG/OB truck operations that already have digital-ready transmitters, such as the Nucomm Newscaster VT1 or PT6. The Newscaster TX1 accepts one video and two analog audio inputs, or two digital audio and one SDI digital video inputs. The COFDM modulator also has a DVB-ASI direct input. The MPEG2 encoder can be operated as a stand-alone encoder with its data rate field programmable up to 32 Mbps. A DVB-ASI output from the encoder is provided. (A pilot tone can be turned on, which aids in the initial acquisition of the COFDM signal.)

FEATURES:

- 70 MHz DVB-T compliant
- QPSK, 16QAM and 64QAM
- 4:2:0/4:2:2 encoding
- 6, 7 and 8 MHz bandwidth supported
- Inputs:
 - One composite video plus two analog audio
 - One SDI digital video plus AES/EBU digital audio
 - DVB-ASI input to COFDM Modulator
- Output:
 - DVB-ASI from MPEG2 encoder
 - 70 MHz COFDM modulation
- PAL and NTSC compatible
- Switchable pilot tone for initial acquisition
- Three preset quick keys
- RS-232 remote control and monitoring

OPTIONS:

- Internal test generator with color bars and field programmable active ID for link confirmation. ID is also inserted into the SDT service name for identification at master control

TP4D/PA4D

Digital ENG/OB Truck Package Transmitter Systems



The TP4D is designed exclusively for Digital/Analog ENG or OB trucks to carry both COFDM and analog. The digital transmitter is removable from the control drawer and can be tripod mounted for use at other locations. The power amplifier, PA4D, operates in the saturated maximum power mode for analog operation and at a reduced power level for digital operation. The package includes: PT3D or PT6 digital/analog transmitter, PA4D mast-mount digital power amp, and the 2RU power supply and control drawer covering 1.3 to 15.4 GHz. The front panel RF power meter displays the RF power at the antenna interface.

FEATURES:

- Digital and analog operation
- Remote standby operation using video presence detector
- Field-selectable audio subcarriers
- High to low RF power control
- Antenna polarity switch
- Bypass mode
- 2RU rack space
- Slide-out drawer

SYSTEM INCLUDES:

- PT3D or PT6 transmitter
- PA4D mast-mounted amplifier
- Rack-mount power supply
- PSI5SD control drawer

OPTIONS:

- Internal signal generator with color bars and 16-character ID

MMPT3

Mast Mount Analog ENG/OB Transmitter System in Bands from 1.3 to 15.4 GHz



The MMPT3 is designed for analog ENG or OB trucks and is NTSC and PAL compatible. The system is configured using two units, an RF head that mounts at the antenna and a video/audio processing and control unit that mounts inside the truck. The two units interface via coax (baseband signal) and multi-core cable (power and control).

FEATURES:

- Single, dual or tri-band configurations available
- Remote standby operation using video presence
- Field-selectable audio subcarriers
- High to low RF power control
- RF output power meter
- Antenna polarity switch
- Line and microphone operation with auto gain control and over-modulation LED

OPTIONS:

- Internal signal generator with front panel control, color bars and 16-character ID

TP3A/PA4A

ENG/OB Analog Truck Package Transmitter Systems in Bands from 1.3 to 15.4 GHz



The TP3A is designed exclusively for analog ENG or OB trucks and is NTSC and PAL compatible. The package includes PT3 transmitter, PA4A mast-mount power amp and PS15SA power supply/control drawer (2RU), covering 1.3 to 15.4 GHz.

FEATURES:

- Single and dual band configurations available
- Remote standby operation using video presence
- field-selectable audio subcarriers
- High to low RF power control
- RF output power meter
- Antenna polarity switch
- Bypass mode
- Line and microphone operation with auto gain control and overmodulation LED

SYSTEM INCLUDES:

- PT3
- PA4A mast-mounted amplifier
- Rack-mount power supply
- PSI5SA control drawer

OPTIONS:

- Internal signal generator with front panel control color bars and 16-character ID

NEWSBLASTER

Newsblaster/Megablaster ENG/OB Van Antennas



The Newsblaster or Megablaster ENG/OB Van Transmit Antenna Series is the finishing touch to a digital or analog ENG/OB van transmit system. These high gain antennas are available in single- and multiple-band configurations and with all popular polarization formats. Certain models are available with solid-state switching. For even higher gain requirements, the Megablaster is the perfect choice. For Airborne transmit antennas see the COFDM SkyMaster antenna on page 22.

FEATURES:

- Low profile, offset feed design
- Single, dual and quad polarity, remote selectable
- Rugged honeycomb/fiberglass design
- Excellent front to back ratio and sidelobe performance
- Lightweight
- Mounts directly to Quickset QPT90 pan & tilt head
- Solid state switching models available

Newsblaster

- Single, dual and tri-band models
- Gain: 20 dBi at 2 GHz, 30 dBi at 7 GHz, 34 dBi at 13 GHz
- Reflector size 21" H x 25" W, weight 27 lbs.

Megablaster

- Single and dual band models
- Gain: 23 dBi at 2 GHz, 34 dBi at 7 GHz
- Reflector size: 54 x 37.5", weight 40 lbs.

OMNI DIRECTIONAL TRANSMIT ANTENNA

ENG/OB Van Antennas



Omni Directional Transmit antennas are used in COFDM digital ENG/OB systems as supplemental antennas to the main transmit antenna such as the Nucomm Newsblaster. These antennas, available in linear polarization, often provide for quick short-range shots without the need for raising the main antenna mast. An omni antenna also provides for moving digital/COFDM shots (conditions permitting). The Omni Antennas are available with either 2 dB or 5 dB gain. Higher gain models are available upon request. For airborne transmit antennas see the COFDM SkyMaster Antenna on page 22.

FEATURES:

- Available in either 2 or 7 GHz models
- Van mounting brackets optionally available
- Other frequency bands available upon request

PT6/RX6

Analog/Digital Portable Video Transmitter and Receiver Covering 1.3 to 15.4 GHz



PT6



RX6

FEATURES:

- Analog or digital transmission
- COFDM QPSK, 16QAM and 64QAM
- PAL or NTSC compatible
- 4:2:0/4:2:2 encoding/decoding
- All functions and parameters are controlled through front panel smart LCD display
- Remote control via RS-232 interface
- Frequency agile up to 128 preset channels
- Dual IF bandwidth selectable (RX6)
- Built-in universal power supply, 90-260 VAC, 11-32 VDC

OPTIONS:

- Integrated analog and COFDM/MPEG2 mod/demod
- Color bar test generator with field-programmable ID

The PT6/RX6 single box agile portable transmitter/receiver pair are designed for ENG/OB trucks, tripods or airborne applications. They can be configured for both internal analog and COFDM/MPEG2 operations, or with a single internal or external analog or COFDM-/MPEG2 modem. For portable external mod/demods see the Newscoder TX2/RX2 on page 18. Optional color bars with ID and internal T1 modems are available.

PT5D/RX5D

Digital/Analog ENG/OB Two Box Portable Transmitter/Receiver Covering 1.3 to 15.4 GHz



The PT5D/RX5D digital/analog portable microwave series is designed for international outside broadcast and emergency restoration and covers the 1.3 to 15.4 GHz frequency range in bands. This is a "two box" system, offering a number of unique features and options. The PT5D/RX5D is designed specifically for COFDM operation and contains an integrated COFDM/MPEG2 modulator/-demodulator. Optionally an analog mod/demod can be added. The system mounts easily to tripods and uses triaxial cable (up to 300m) between the two units. A number of portable antennas (one to four feet) interface easily with the radios. The radios offer frequency agility, AC/DC operation, four field programmable audios, one video and baseband input. For portable external COFDM/MPEG2 modulator/demodulators see the Newscoder TX2/RX2 on page 18.

FEATURES:

- Analog or digital transmission
- Integrated or external COFDM/MPEG2 mod/demod
- DVB-ASI input/output in digital mode
- Separate RF head and control unit (up to 300 meters)
- PAL or NTSC compatible
- 4:2:0/4:2:2 encoding/decoding
- Frequency agile
- Intercom between control and RF head
- Audible and visual alignment aid
- Simplex and duplex configurations
- Remote control
- Channel plan field programmable
- Universal power supply, 100-260 VAC, 11-32 VDC

OPTIONS:

- Test generator with SMPTE/EBU color bar and 16-character ID
- Variety of single and multi-band antennas
- Battery packs, rain shield, carrying cases and tripods
- High power configurations

PT3D/RX3D

Analog/Digital Portable Transmitter and Receiver in Bands from 1.3 to 15.4 GHz



The PT3D/RX3D series has evolved from Nucomm's popular PT3/RX3 portable transmitter/receiver. The PT3D/RX3D series is offered in several different configurations, designed to meet both digital and analog ENG/OB requirements. The PT3D transmitter can be configured for both internal analog and COFDM/MPEG2 modulators, with a single modulator or with 70 MHz input only. The RX3D can be supplied with an integrated COFDM/MPEG2 and an analog demodulator. Optional color bars with ID available. All configurations are digital-ready, user-friendly and easy to set up. The aluminum housing is rugged and weatherproof. The features are designed to serve every portable environment, including tripod, backpacks, helicopters and ENG trucks. For portable external COFDM/MPEG2 modulators/demodulators see the Newscoder TX2/RX2 on page 18.

FEATURES:

- COFDM DVB-T compatible
- Remote control via RS-232 interface
- 4:2:0/4:2:2 encoding/decoding
- Channel plan field programmable
- Receive signal strength meter and beeper (RX3D)
- Dual IF bandwidth selectable (RX3D)
- Ultra low noise synthesizer
- PAL or NTSC compatible
- Rugged and weather-resistant clamshell housing
- Universal power supply, 100-260 VAC, 11-32 VDC

OPTIONS:

- Test generator with color bars and ID
- Integrated COFDM/MPEG2/analog
- Portable COFDM (Newscoder TX2 and RX2)
- High power, 5 watt digital, 12 watt analog at 2 GHz
- Remote control module
- Antennas with quick disconnect

CAMPAC

COFDM Camera-Back Transmitter for 2 or 7 GHz Frequency Bands



The CamPac is a miniature COFDM wireless camera transmitter designed to deliver full broadcast quality in a small, lightweight and rugged aluminum case that fits on the back of a portable video camera. The transmitter mounts to professional cameras using a standard Anton Bauer mounting kit.

For wireless camera applications, a vertically polarized antenna attaches directly to the RF output ensuring maximum ERP.

The CamPac utilizes a 16 position field programmable presets to select transmitter parameters such as frequency, power output, video and audio type, and COFDM modulation types. Field programming is by RS-232 or IR interface to a PC or PDA device.

FEATURES:

- Compact, lightweight and rugged
- Integrated COFDM/MPEG2
- 4:2:2/4:2:0 encoding
- DVB-T compatible
 - QPSK, 16QAM, and 64QAM selectable
 - 6, 7 and 8 MHz selectable bandwidth
 - Selectable forward error correction and guard interval
- Up to 0.5 watt RF output at 2 GHz—high/low switchable
- Low power consumption
- NTSC/PAL compatible
- Composite, component or SDI Video
- 2 audio – analog, AES/EBU, SDI de-embedded
- Mounts using standard Anton Bauer mounting
- Compatible with any DVB-T receiver – Newscaster CR, RX5D, RX6, RX3D
- Remote controllable via RS-232 and IR

NEWSCODER TX2

Portable COFDM Modulator and MPEG2 Encoder



The Newscoder TX2 Series portable 70 MHz COFDM Modulator and MPEG2 Encoder is specifically designed for the portable ENG/OB Television Broadcaster. This small lightweight, versatile MPEG2 Encoder/COFDM Modulator is housed in a half RU chassis. It is ideal as a companion for portable digital ENG and helicopter operations that already have digital-ready portable transmitters such as the Nucomm PT6 or PT3D. The Newscoder TX2 accepts one video and two analog audio inputs or two digital audio and one SDI digital video inputs. The MPEG2 encoder can be operated as a stand-alone encoder with its data rate field programmable up to 30 Mbps. A DVB-ASI output from the MPEG2 encoder is provided. (A pilot tone can be turned on which aids in the initial acquisition of the COFDM signal.) For van applications, see the Newscoder TX1 on page 13.

FEATURES:

- 70 MHz DVB-T compliant
 - QPSK, 16QAM and 64QAM
- 4:2:0/4:2:2 encoding
- 6, 7 and 8 MHz bandwidth supported
- Inputs:
 - One composite video plus two analog audio
 - One SDI digital video plus AES/EBU digital audio
 - DVB-ASI input to COFDM modulator
- Output:
 - DVB-ASI from MPEG2 encoder
 - 70 MHz COFDM modulation
- PAL and NTSC compatible
- Switchable pilot tone for initial acquisition
- Three preset quick keys
- RS-232 remote control and monitoring

OPTIONS:

- Internal test generator with color bars and field programmable ID

NEWSCODER RX2

Portable COFDM Demodulator and MPEG2 Decoder



The Newscoder RX2 is a portable COFDM 70 MHz receiver/demodulator and MPEG2 decoder. The RX2 is ideal for every portable environment including tripods, backpacks, helicopters and ENG/OB trucks. Housed in a rugged, weatherproof, aluminum housing, the Newscoder RX2 occupies only one-half the width of a 1RU high chassis. Its internal AC and DC universal power supply (100 to 260 VAC & 11 to 32 VDC) means that the Newscoder RX2 can be used anywhere in the world. The Newscoder RX2 is an ideal companion product to either the RX6 or the RX3D portable digital receiver. For rack-mount version see the Newscoder TX1 on page 13.

FEATURES:

- DVB-T compliant
 - QPSK, 16QAM and 64QAM
- 4:4:2:0/4:2:2 decoding
- 6, 7 and 8 MHz selectable bandwidth
- Auto-senses receive modes
- Inputs:
 - DVB-ASI to MPEG2 decode
 - 70 MHz input:
- Outputs:
 - One composite video plus two analog audio
 - One SDI digital video plus AES/EBU digital audio
- Universal power supply, 100-260 VAC, 11-32 VDC
- PAL and NTSC with auto detect
- Three preset quick keys
- RS-232 remote control and monitoring

MPT2D

Mini-COFDM Microwave Transmitter with Integrated MPEG2 for 2 and 7 GHz Bands



The MPT2D is a miniature 2 or 7 GHz COFDM wireless microwave transmitter designed to deliver broadcast quality video and audio in a small, lightweight and rugged aluminum case. Applications of this versatile transmitter include wireless cameras, security and race-cam requirements. For wireless applications, a vertically polarized antenna attaches directly to the RF output transmitter. Inputs are PAL and NTSC compatible.

FEATURES:

- Integrated COFDM/MPEG2
- 4:2:2/4:2:0 encoding
- DVB-T compatible
 - QPSK, 16QAM 64QAM selectable
 - 6, 7 and 7 MHz selectable bandwidth
 - Selectable FEC and guard interval
- Up to 0.5 watt RF output—high/low switchable
- Composite, component or SDI video
- 2 audio – analog, AES/EBU, SDI de-embedded
- Mounts using standard Anton Bauer mounting
- 16 presets
- Remote controllable via RS-232 and IR

M2-ENCODER-2

Portable MPEG2 Encoder



Nucomm's M2-Encoder-2 Series is a light weight and versatile MPEG2 video encoder. The portable M2-Encoder-2 is housed in a half rack, rugged and weather proof case. The M2-Encoder-2 has a self-contained universal power supply that accepts both 100 to 260 VAC and 11 to 32 VDC.

FEATURES:

- Inputs:
 - Video: composite, component, ASI and SDI
 - Audio: 2 Analog pair, 2 AES/EBU
- Output
 - DVB-ASI and SDI at ML encoding
- 4:2:0/4:2:2 encoding
- PAL and NTSC compatible
- RS-232 remote control and monitoring
- Three preset quick keys
- Data rates front panel selectable to 50 Mbps
- Optional color bars with ID

M2-DECODER-2

Portable MPEG2 Decoder



Nucomm's M2-Decoder-2 Series is a light weight and versatile MPEG2 video decoder. The portable M2-Decoder-2 is housed in a half rack, rugged and weather proof case. The M2-Decoder-2 has a self-contained universal power supply that accepts both 100 to 260 VAC and 11 to 32 VDC.

FEATURES:

- Inputs
 - DVB-ASI, SDI, serial transport stream
- Outputs:
 - Video: Composite, Component, ASI and SDI
 - Audio: 2 Analog pair, 2 AES/EBU
- 4:2:0/4:2:2 decoding
- PAL and NTSC compatible
- RS-232 remote control and monitoring
- Three preset quick keys
- Accepts input data rates to 50 Mbps

PT5A/RX5A

ENG/OB Analog Two Box Portable Transmitter/Receiver Covering from 1.3 to 15.4 GHz



Nucomm's PT5A/RX5A analog "two box" frequency agile units are designed for analog ENG/OB tripod, vehicle, and semi-fixed applications. The two units can be separated up to 300 meters via a triaxial cable. The triaxial cable carries a 70 MHz IF signal, DC power, two-way communication, and microprocessor control and monitoring. This high-performance system is easy to set up in the field, and the rugged design ensures that it can withstand the punishment of the harsh ENG/OB environment. Multi-band units and optional built-in color bars with ID are available.

FEATURES:

- Frequency agile/multi-band
- Separate RF and control unit (up to 300 meters)
- Transmits power up to 12 watts
- Two-way microprocessor control
- Simplex and duplex configurations
- Audible and visual alignment aid
- Waterproof/weatherproof
- Universal power supply, 100-260 VAC, 11-32 VDC
- Intercom between control and RF head

OPTIONS:

- Test generator with SMPTE/EBU color bar, multi-burst, ramp and 16-character ID
- Variety of single and multi-band antennas
- Battery pack, rain shield, carrying cases and tripods
- High power configurations

PT3/RX3

Portable Analog Transmitter: Single and Multi-Band Units Cover 1.3 to 15.4 GHz



The PT3/RX3 single box units are designed for analog ENG or OB trucks, tripod or airborne applications and are NTSC and PAL compatible. The PT3/RX3 features are designed to serve every portable environment – from tripods and backpacks to helicopters and ENG/OB trucks. The PT3/RX3 are extremely rugged and sealed in a diecast aluminum clamshell enclosure which protects against weather and abuse.

FEATURES:

- Rugged and weather resistant clamshell housing
- Available in single, dual or tri-band configurations
- Signal-strength beeper for easy alignment (RX3)
- Signal-strength meter with actual signal strength: digital and analog display (RX3)
- Universal power supply, 100-260 VAC, 11-32 VDC
- Field-selectable audio subcarriers
- Quick connect antenna mount
- Line and mic operation with auto gain control and over-modulation LED (PT3)
- Remote control interface
- PAL or NTSC compatible

OPTIONS:

- Internal signal generator with front panel control color bars and 16-character ID (PT3)
- Switchable IF filters
- High power configurations

MPT2A

Miniature Analog Transmitter Covering 1.3 to 8.5 GHz



The MPT2A is designed for analog P.O.V., wireless cameras, and in car and airborne applications and is NTSC or PAL compatible.

FEATURES:

- PC programmable transmitter functions
- Small size: 1.33" x 2.75" X 3.95"
- 32 field-selectable channels
- Remote control and monitoring via RS-232 port
- One watt RF power
- Field-selectable audio subcarriers
- Audio and video deviation remotely programmable
- Line and mic operation

OPTIONS:

- A full line of accessory items are available including antennas, hand-held monopod/walking sticks and battery packs

COFDM SKYMASTER

GPS Electronically Steerable Antenna System



The SkyMaster is a 2 GHz band, all solid-state, airborne antenna for digital and analog video downlink applications with a gain of 13 dBi.

The SkyMaster, developed specifically for COFDM digital applications, is an electronically steerable pod antenna system with an integral GPS receiver that provides fully automated steering in airborne applications, including broadcast ENG, law enforcement and military applications. The electronic steering feature eliminates moving parts, which can be a source of failure, and replaces them with time tested electronic steering technology, similar to that used in today's radar antennas. Consult Nucomm for a 7 GHz system requirements.

FEATURES:

- Specifically designed for COFDM operation
- Improved digital performance
- Smaller and lighter weight than electro-mechanical steerable antennas
- 13 dB gain at 2 GHz
- Integrated GPS receiver and compass
- Integrated down-look receive antenna with optional tunable filter
- All solid-state and no moving parts result in excellent reliability
- Small and simple handheld controller with clearly marked touch-screen buttons
- Selectable omni, manual or tracking mode
- Compact handheld device controls both the antenna and transmitter
- Configurable for transmit and receive applications
- Integrated 12 watt PA for higher ERP (optional)

HELICOPTER AERO-FRAME

Efficient Mounting System for Nucomm Portable Radios



Nucomm's Aero-Frame is a small and lightweight half mounting rack for easy installation of Nucomm portable radios into various types of aero vehicles such as helicopters, airplanes and blimps. This half rack unit easily mounts in baggage compartments with two to four mounting screws. The Aero-Frame can be supplied with either AC or DC power strips on one side.

FEATURES:

- Small and lightweight
- Half Rack mounting width
- Easy to mount in all types of aero vehicles
- Designed specifically for Nucomm portable products: PT6, RX6, PT3D, RX3D, NCRX2, NCTX2
- Available in two heights, for mounting 2 or 4 Nucomm portable radios

PORTABLE REMOTE CONTROLLER

Controls all Nucomm Portable Radios



FEATURES:

- Hand held or panel mount
- Small and lightweight
- Transmitter control:
 - Frequency/channel
 - High/low power
 - Analog/digital operation
 - Standby
- Receiver control:
 - Frequency/channel
 - Analog/digital operation

MEGAHORN

Portable ENG/OB Antennas



The Megahorn Antenna Series offers a rugged, lightweight design that provides for quick antenna setup. These antennas are available in bands between 1.3 and 15.4 GHz and in a variety of gains. The compact size makes the Megahorn ideal for packing in transit cases and for use in portable tripod applications. Two versions are available—the first provides for direct mounting the Megahorn to a PT/RX portable transmitter or receiver via a Nucomm quick release bracket. This provides for cable-free RF connections and is the preferred configuration for tripod portable configurations. The second

FEATURES:

- Frequency bands 1.3 to 15.4 GHz
- High gain, small footprint
- Ideal for wideband operation
- Linear and circular polarity models
- High front to back ratio, low sidelobes

version provides “N” type connectors and is commonly used for pole or mast mounting applications. Pole mounting kits are available. Megahorns are commonly used on ENG/OB vehicles as supplemental transmit and receive antennas.

PORTABLE PARABOLIC

High Gain Antennas



The Portable Parabolic Antennas are ideal when high gain becomes the overall system consideration. Two versions are available, the first providing for direct mounting of the antenna to a PT/RX portable transmitter or receiver via a Nucomm quick release antenna mounting bracket. This provides for a cable-free RF connection and is available for 1' or 2' models only. The second configuration provides a type “N” connection, mounting to a PT/RX Portable transmitter or receiver via an optional L bracket and RF cable. This version is necessary for 3' and 4' models.

FEATURES:

- Frequency bands 1.3 to 15.4 GHz
 - 1', 2', 3', and 4' reflector sizes
- Rugged aluminum spun reflector
- Ideal for wideband operation
- High gain
- Linear or circular polarity
- Dual polarity models available
- Fast and easy set up
- High front to back ratio, low sidelobes

TRUNCATED PORTABLE ANTENNAS

Frequency Bands 1.3 to 15.4 GHz



The Nucomm Truncated Antenna is ideal for high gain portable applications. The truncated shape allows for easy packing in a transit case. The antenna feeds quickly snaps in and out using a twist lock vortex. This feature allows for fast antenna feed changing and makes

FEATURES:

- Frequency bands 1.3 to 15.4 GHz
- Linear or circular polarity
- Rugged, lightweight
- Fast and easy setup
- High front to back ratio, low sidelobes
- Available sizes
 - TD1, 7 x 14" reflector direct mount
 - TD2, 15 x 24" reflector direct mount

the Truncated Series an ideal companion product to the PT/RX dual and tri-band portable transmitters and receivers. The Truncated Antenna mounts directly to the PT/RX via a Nucomm quick release, antenna mounting bracket.

PORTABLE SPECIALTY ANTENNAS

Nucomm offers a complete range of antennas for a wide variety of applications including tripod mounted portables, camera mounting omni, sports antennas and van transmit/receive antennas. Nucomm can supply special purpose antennas for custom requirements upon request.

FEATURES:

- Omni-directional antennas
- Up/down look antennas
- Directional antennas
- Other specialty antennas available upon request

PORTABLE ACCESSORIES



PORTABLE ACCESSORIES:

- Remote control units
- Heavy-duty and super heavy-duty tripods
- Transit cases, all sizes
- Soft antenna carry bags
- Batteries, all types
- Cables and connectors
- Rain shields for PT/RX
- "L" brackets
- Monopod/walking stick
- Other accessories available upon request

NEWSCASTER CR

Analog/Digital ENG/OB Central Receiver Covering from 1.3 to 15.4 GHz



Nucomm's high performance Newscaster CR radio is designed specifically for the television ENG/OB operator and is ideal for the transition to digital. The central receiver operates in both analog or digital modes. This highly reliable, flexible and cost-effective ENG/OB central receiver operates in the 2 GHz band. It is configurable for multi-band operation to support the 7, 13 and 14 GHz bands using external block downconverters.

The Newscaster CR can be configured with an internal or external COFDM demodulator and MPEG2 decoder for digital reception. Also available are other external digital demodulators such as COFDM, 16QAM to 256QAM, ATSC, VSB and digital-ready block downconverters.

FEATURES:

- Ultra high performance, advanced design to meet both analog and digital transmission requirements including COFDM
- Internal or external (Newscoder RX1) COFDM demodulator and MPEG2 decoder
- Dual or triple band operation using optional digital-ready block downconverters
- One switch changes radio from analog to digital
- Superior receive threshold
- Superior adjacent channel rejection
- Rejects PCS signals
- Compatible with most ENG/OB remote control systems

NEWSCODER RX1

COFDM Demodulator/MPEG2 Decoder



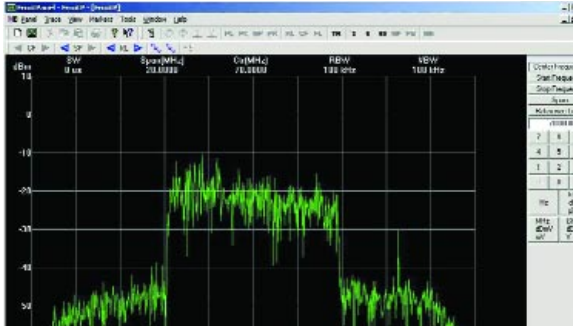
The Newscoder RX1 Series is an innovative 70 MHz COFDM demodulator and MPEG2 decoder in a 1RU case. It is an ideal companion to the Newscaster CR, Nucomm's digital central receiver. The Newscoder RX1 is designed with the features needed for ENG/OB central receiver systems where performance is critical. The unit outputs one video, two analog audios, two digital audios and a SDI digital video transport stream. A DVB-ASI is also outputted from the COFDM demodulator. The MPEG2 decoder can be independently fed by a DVB-ASI input. For portable operation such as in helicopters, the Newscoder RX2 Portable version is also available.

FEATURES

- DVB-T compliant; QPSK, 16QAM and 64QAM
- 4:2:0/4:2:2 decoding
- Auto-senses receive modes
- 6, 7 and 8 MHz bandwidth supported
- Outputs:
 - One composite video plus two analog audio
 - One SDI digital video plus AES/EBU digital audio
 - Digital transport stream by DVB-ASI
- Input:
 - DVB-ASI to MPEG2 decoder
- PAL and NTSC compatible
- Three preset quick keys
- RS-232 remote control and monitoring

COFDM SPECTRUM VIEWER

Remote COFDM ENG/OB Operation



The COFDM Spectrum Viewer gives master control a new, unique and powerful tool for analyzing and tuning in ENG shoots that otherwise may be marginal or lost. The COFDM Spectrum Viewer attaches to the 70 MHz output of a central receiver and sends the resultant channel spectrum back to master control over a low data-rate telephone, network or internet communication channel to be viewed and controlled through a remote terminal, such as a PC computer.

With the Spectrum Viewer, master control can now examine selected channels, as well as adjacent channels for interference before ENG operation begins. Once ENG operation begins, the viewed spectrum is invaluable in tuning the signal.

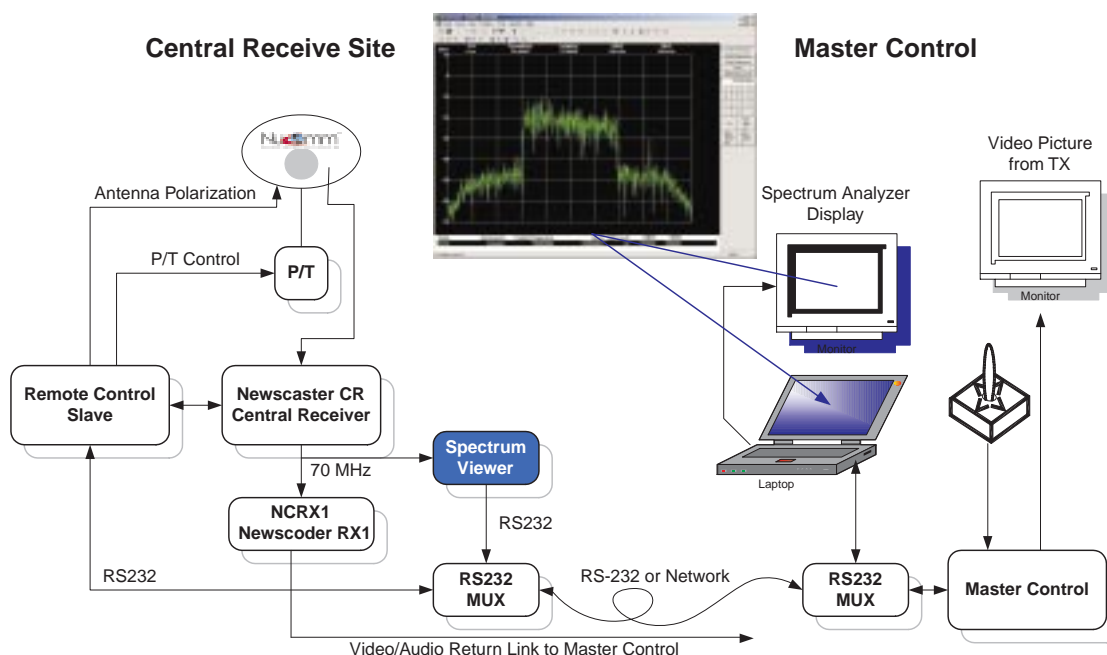
In COFDM operation, the signal is spread over 8 MHz and often difficult to detect when the signal is weak. The COFDM signal can be seen on the Spectrum Viewer before the signal strength meter shows the presence of a signal. By viewing a COFDM signal spectrum, the antenna can be adjusted to minimize multi-path interference and maximize the signal level.

FEATURES:

- Identifies the signal before the picture appears
- Observes receiver IF spectrum on a remote terminal
- Uses low data-rate telephone, network or internet connections
- Remote control of spectrum viewer
- Observes channels for interference
- Identifies COFDM lock-up problems caused by:
 - Interfering signals
 - Adjacent signals
 - Multi-path
 - LNA saturation
- Helps tune in very weak signals

Often the COFDM receiver/decoder will not lock up because of deep multi-path notches within the 8 MHz signal or because of a strong signal that can saturate the receivers LNA. By viewing this signal on the Spectrum Viewer, the operator can make a slight adjustment of the antenna and eliminate the lock-up problem, thus improving the reliability of the received video.

Operation of the Nucomm "Spectrum Viewer"



PROSCAN DR III

Cosecant Squared Steerable Antenna Receive System



The ProScan DR III is the highest gain ENG central receive antenna currently available. The DR III, with its new 3-piece radome design, offers lower windload than previous ProScan Antenna Systems while still offering the high gain that many ENG systems demand. The cosecant squared reflector design virtually eliminates requirements for elevation travel in many applications. The antenna incorporates a solid state switching feed, with high dynamic range LNA/filter and offers the latest PCS/MMDs filter protection. A choice of 6/7, 12/13, 14/15 GHz block downconverters is provided. The 7 GHz version comes standard with digital-ready DRO for COFDM operation. The ProScan DR III is available in either non-continuous or continuous configurations. Continuous rotation is preferred for helicopter or fixed wing aircraft, auto tracking applications.

FEATURES:

- 1.4 meter cosecant squared design
- Real time diagnostic trouble shooting feedback from antenna to master controller
- New integrated 3-piece radome design with access door
- Antenna gain, 26 dBi at 2 GHz, 36 dBi at 7 GHz, 41 dBi at 13 GHz
- Single, dual and tri-band models available
- 24 dB gain LNA (2 GHz) with remote 24/12 dB gain reduction switching on LNA
- Digital-ready
- New optical encoders eliminate conventional potentiometers
- 2/2.5, 6/7, 12/13, 14/15 GHz bands
- Quad polarization (H,V, LCP, RCP)
- Rugged dual speed rotator

ELLIPSE DR II

Steerable Central Receive Antenna System with Pan and Tilt



The Ellipse DR II ENG Central Receive Antenna System is ideal when control over both the antenna azimuth and elevation is desired. The antenna incorporates a solid state switching feed, with high dynamic range LNA/filter and offers the latest PCS/MMDs filter protection. A choice of 6/7, 13, 14/15 GHz block downconverters is provided. The 7 GHz version comes standard with a digital-ready DRO for COFDM operation. The Ellipse is available in either non-continuous or continuous configurations. Continuous rotation is preferred for helicopter or fixed wing aircraft, auto tracking applications.

FEATURES:

- Dual axis pan and tilt control
- Compact two-piece integrated radome with access door
- Antenna gain, 23 dBi at 2 GHz, 34 dBi at 7 GHz, 36 dBi at 13 GHz
- Single, dual and tri-band models available
- 24 dB gain LNA (2 GHz) with remote 24/12 dB gain reduction switching on LNA
- Digital-ready
- New optical encoders eliminate conventional potentiometers
- 2/2.5, 6/7, 12/13, 14/15 GHz bands
- Quad polarization (H,V, LCP, RCP)

ULTRASCAN DR II

Low Profile Steerable Central Receive Antenna System



The UltraScan DR II ENG Central Receive Antenna System is ideal when tower space and windloading are a prime consideration. The UltraScan is a pan only antenna system. The antenna system incorporates a solid state switching feed, with high dynamic range LNA/filter, and offers the latest PCS/MMDS filter protection. A choice of 6/7, 12/13, 14/15 GHz block downconverters is provided. The 7 GHz version comes standard with a digital-ready DRO for COFDM operation. The UltraScan is available in either non-continuous or continuous configurations. Continuous rotation is preferred for helicopter or fixed wing aircraft, auto tracking applications.

FEATURES:

- Low profile, low wind Loading
- Compact 2-piece radome
- Antenna gain, 20 dBi at 2 GHz, 30 dBi at 7 GHz, 34 dBi at 13 GHz
- Single, dual and tri-band models available
- 24 dB gain LNA (2 GHz) with remote 24/12 dB gain reduction switching on LNA
- Digital-ready
- New optical encoders eliminate conventional potentiometers
- 2/2.5, 6/7, 12/13, 14/15 GHz bands
- Quad polarization (H,V, LCP, RCP)

DIGITAL-READY UPGRADE KIT

2 and 7 GHz Central Receive System



Central receive antenna systems employ block downconverters to convert the higher frequency bands such as 7 and 13 GHz down to the 2 GHz range for transmission over the coaxial cable run to the central receiver. With normal analog FM signals, a frequency stability of 1 MHz was adequate. With digital transmissions, both the stability and frequency accuracy must be improved by an order of magnitude, and the phase noise must be decreased and controlled.

The Digital-Ready Upgrade Kit can be purchased as part of a new replacement feed for an existing antenna. Consult Nucomm with existing antenna part numbers and Nucomm will provide the recommended upgrade.

For new digital-ready applications, Nucomm offers the same capability in the Digi-BDC Series (see page 31).

FEATURES:

- Upgrades existing 2 and 7 GHz steerable central receive antenna systems to digital-ready
- LNA has high dynamic range in the 2/2.5 GHz band with switchable 24/12 dB gain
- Provides the required frequency accuracy for digital signals utilizing COFDM technology
- Phase-locked DRO design, high stability
- Low phase-noise
- Latest PCS/MMDS filter
- Latest solid state switching

Upgrade kits available for the following existing antenna systems:

Microscan I 2 & 2/7 GHz

ProScan & ProScan II 2 & 2/7 GHz

UltraScan I 2 & 2/7 GHz

FLAT PANEL SECTOR SCAN

90° Sector ENG Receive Antenna



The flat panel antenna can be purchased as a stand alone antenna to cover a specific 90° coverage area, or can be combined with up to four sectors providing a complete 360° system.

Complete sector systems are configured according to each customer location, application and system configuration. Please consult Nucomm with specific requirements for system design assistance.

FEATURES:

- Available in 2, 7 and 13 GHz bands
- Single, dual and tri-band systems
- 13 dBi gain standard; higher gain 16 dBi available on certain models
- Flat panel, lightweight and rugged design
- Low wind loading
- Easily installed
- Advanced solid state switching
- Standard mount 2.5-4.5 in diameter

OPTIONS:

- 15 degree downtilt kit available
- Local and full remote control systems available
- LNA, block downconverter, digital DRO, PCS/MMDS filter available

QUAD SECTOR

Sectorized Central Receive Antenna System



The Quad Sector Antenna represents a new design approach to ENG central receive antenna systems.

This 2 GHz antenna will provide 360° coverage at a much higher gain level than a traditional omni and at a fraction of the cost of a sector or steerable receive antenna system. The antenna sectors can be switched locally or via an optional remote control system.

FEATURES:

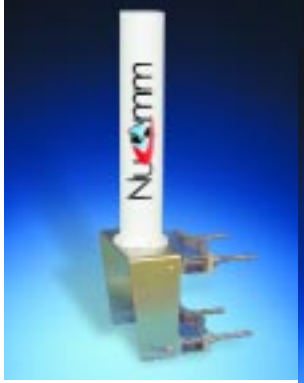
- 1.9 - 2.5 GHz
- Four switchable 90° sector arrays within a single radome
- High gain, 16 dBi, vertical polarization
- Easily deployed as a temporary or permanent installation
- Non-steerable design eliminates the need for a pan and tilt unit
- Lightweight/low wind loading
- Easily installed
- Highly reliable PCB mounted RF switches
- Includes pole mount kit

OPTIONS:

- LNA and PCS/MMDS filter available in a separate weather proof enclosure
- Local and full remote control systems are available

OMNI POLE

Omni Directional ENG Receive Antenna



7 GHz



2 GHz

The Omni Pole Antenna is ideally suited where a low cost, low maintenance receive system is desired as a main

receive site or as an auxiliary site. The Omni Pole performs best where frequency congestion is at a minimum and short to mid range distance ENG shots are satisfactory. The antenna can be supplied stand alone or with an optional LNA, PCS MMDS filter or block downconverter in a separate weather proof enclosure.

FEATURES:

- Provides 360° coverage
- Available in either the 2 GHz or 7 GHz band
- Vertical polarization standard
- Gain, 11 dBi
- Lightweight, low wind load
- No switching or control system required
- No moving parts
- Mounting hardware included

OPTIONS:

- LNA and PCS/MMDS filter available in a separate weather proof enclosure
- 7-2 GHz block downconverter with digital DRO available

DIGI-BDC

Digital Block Downconverter



Nucomm's high performance Digi-BDC, (Digital Block Downconverter) is designed specifically for digital ENG/OB central receive antenna systems. The Digi-BDC is designed to pass COFDM and meet the stringent requirements of frequency stability, phase noise, microphonics and temperature.

Many existing antenna systems contain block downconverters designed for analog operation which do not meet the frequency stability and phase noise requirements of digital systems employing COFDM modulation.

FEATURES:

- Single, dual and tri-band configurations
- 7 and 13 GHz, other bands available upon request
- Upgrade existing central receive antenna systems to digital-ready
- Specifically designed to pass COFDM modulation
- Ultra low noise, crystal stabilized, phase-locked DRO
- Stability better than 5 PPM over extreme temperature range

LOW NOISE AMPLIFIER



Nucomm's LNA is ideal as a companion product to an omnidirectional or sector receive antenna or any other antenna that is in need of an LNA to overcome RF cable loss.

FEATURES:

- Single, dual and tri-band configurations
- Designed specifically for COFDM application
- Low noise
- High dynamic range
- Lightning protection
- Single coax carries power and RF
- Power supply included
- Weather proof enclosure
- Channel and band pass filters available

NAVIGATOR CONTROL SYSTEM

Navigator ENG Remote Control System



The Navigator Control System is designed specifically for television ENG operations. A cost-effective alternative to other control systems on the market, this system will provide remote control and monitoring of a tower mounted steerable antenna system and companion central receiver. The Navigator system includes Windows based master control software to be used with an existing PC, a local control unit (1 per site) as well as two 2 wire dial up modems. Four wire modems are optionally available.

A version of the software is available for controlling 90° Sector Receive Antenna Systems.

FEATURES:

- Windows 95, 98 and 2000 based software
- Local control unit with modems allows control of the antenna & receiver either locally or from a remote site.
- Runs on customer supplied PC/laptop
- Fast and slow pedestal control
- Easy to use graphical interface
- Contains transmit site database
- Cost-effective approach to ENG/OB

ADVANCED CAPABILITY MASTER CONTROL SYSTEM



The Advanced Capability Master Control System is for users looking for a system that can expand and grow as their operation grows. The system offers advanced features found only in top of the line, high capability, remote control systems. The master control unit, LCD monitor and local control unit are ideal where a rack mounted system is desired. The intuitive interface allows for fast and easy operation of the system by novice users, and concurrent monitoring of up to six remote sites on a single screen, this allows even the busiest users to manage the incoming signals with enhanced efficiency. For even greater capability, the multiple networked-masters option allows two or more master controllers to be networked together so that any of the masters can control any of the sites

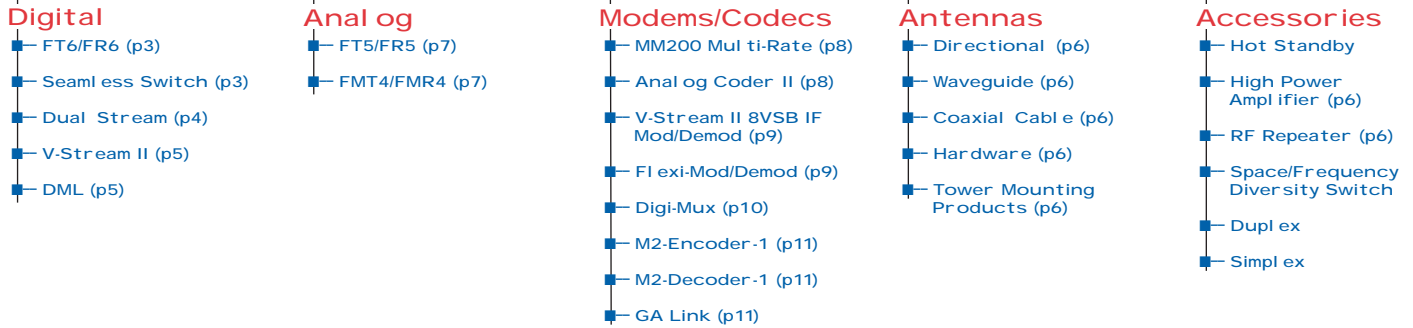
FEATURES:

- PC based master control unit
- 15" flat panel LCD monitor
 - Touch screen interface
- Intuitive graphical user interface
- Map interface (optional—US only)
- Multi-site control and monitoring capability
 - Control as many antenna/camera sites per system as desired
- On screen real time video
 - External 10 x 1 video switcher option
- Auto tracking system using Navtrack equipped transmitter equipment
- Controls antenna and or camera sites
- RS-232, RS-422, two wire, dial-up, four wire & ethernet master/remote communications lines
- Multiple networked master option
- Advanced capability local control unit
 - Complete central receiver control/status
 - Combination of two antennas and/or cameras or one of each per local control unit

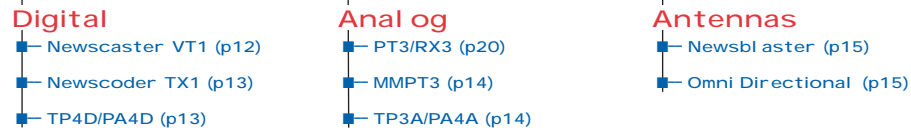
NUCOMM PRODUCT SUMMARY



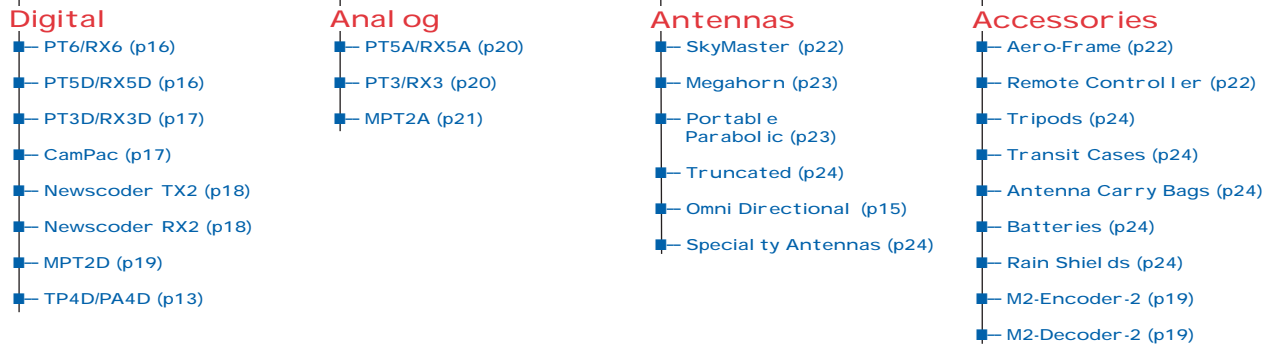
Digital /Anal og STL Systems



Digital /Anal og ENG/OB Systems



Digital /Anal og Portabl e & Airborne Systems



Digital /Anal og Central Receive Systems



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- > DIGITAL/ANALOG STL SYSTEMS
 - > DIGITAL/ANALOG ENG/OB SYSTEMS
 - > DIGITAL/ANALOG PORTABLE AND AIRBORNE SYSTEMS
 - > DIGITAL/ANALOG CENTRAL RECEIVE SYSTEMS

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