



# CHANNELMASTER TX1

Portable Microwave Transmitter



## User Manual

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- Servicing or adjusting equipment.
- Replacement of defective parts.

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

Equipment showing damage by misuse, abnormal conditions of operation, or attempts to repair by other than authorized service personal 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 the 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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## **Customer Service Information**

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### ***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.

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.
- Name of an engineer or technician we may contact in regards to this problem.
- Include a “ship to” and “bill to” address.

Ship to:

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

### ***For International orders***

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.

### ***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.

### ***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 standard line of products.

### ***Field Repair***

Nucomm products are designed with easy access to components to facilitate service. When troubleshooting, the user is cautioned to read all module descriptions in this manual. Some Nucomm modules cannot be serviced in the field. Warnings are included in the circuit descriptions and on certain modules themselves, however; the lack of a warning cannot be construed as a statement of safety. To prevent the voiding of the Nucomm warranty that protects the equipment, please contact Nucomm before servicing or making any repairs.

### ***Shipping Damage***

Equipment shipped FOB Nucomm, Inc.; 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.

### ***Contact Information***

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US: ..... (908) 852-3700  
International:..... 001 - 1 - (908) 852-3700

24-Hour Hotline:

US: ..... (888) 531-3892  
International:..... 001 - 1 - (888) 531-3892

## **CAUTION!**

### **RISK OF ELECTRICAL SHOCK. DO NOT REMOVE COVERS.**

- Do not remove any covers.
- Refer servicing to qualified technicians only.
- Disconnect all power before servicing.
- Read and perform all instructions carefully. Failure to follow suggested instructions and guidelines may void all warranties.



### **FCC STATEMENT**

This equipment has been tested and found to comply with Part 74.637 (a) (2) of the FCC Rules and Regulations. Any unauthorized changes or modifications not expressly approved by Nucomm, Inc. could void the user's authority to operate the equipment, and invalidate the equipment's warranty.

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**Document Revision**

<b>Date Modified</b>	<b>Revision</b>	<b>Modified by</b>	<b>Modification Detail</b>
May 25, 2005	0	M Hardy	Initial release
October 10, 2005	1	M Hardy	Removed reference to RS422 on Page 4-3, Fig 4-3. Added "Frequency Direct" info on 5-2. Updated weights & specs.
January 18, 2006	2	M Hardy	Added BAS relocation. Updated presets.
April 3, 2006	2.1	M Hardy	Misc. fixes; channel offsets
November 6, 2006	2.2	R Risch / M Hardy	Addition of new features and Menu functions, expanding of operation section ( <i>text and graphics</i> ).

Nucomm makes every effort to ensure our documentation is accurate, and as complete as possible.

In the event that you find any errors or omissions in our documentation, please contact Nucomm Customer Service at (908) 852-3700, or via email at [service@nucomm.com](mailto:service@nucomm.com).





## 1. DESCRIPTION

Nucomm's ChannelMaster TX1 is a Digital-Analog Portable Microwave Transmitter. The tripod mounted Microwave Transmitter System is designed to operate in any specified band in the 1.00 GHz to 15.5 GHz frequency range. Each unit is field programmable and configurable to meet a wide range of customer requirements.

Standard features include fifteen presets (*the first five presets allow single button operation*), integrated dynamic color bars, HD transport capability, field programmable RF and Audio Sub-carrier frequencies, RF power control, local LCD display for control and monitoring. Also, special menus have been included to ease the BAS (US) relocation process.

The ChannelMaster is fully integrated with an Analog FM modulator, compliant super-low delay MPEG 2 Encoder, and Multimode Digital Modulator. Available modulations include FM (*NTSC / PAL*), COFDM, optional single carrier QAM, and optional VSB. As additional digital modulation formats become available, the system can easily be software updated. The ChannelMaster TX1 is designed to be an extremely flexible system, with limited circuit complexity.

The system video inputs include SDI, ASI, Composite Video and External 70 MHz. The system comes standard with two analog audios or one digital AES. Optionally, the system can

support four analog audios or two digital AES.

Other available options include: high power amplifier, multi-band operation, and standby power sourcing, as well as other features and options. Contact Nucomm for details.

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



## 2. FEATURES

### 2.1 Configuration

Nucomm's ChannelMaster TX1 Series Digital-Analog Portable Microwave Transmitters are among the most comprehensive portable radios in the world. The ChannelMaster TX1 features are designed for both Analog and Digital operation in portable links, as well as helicopter and ENG/OB applications. In the Digital mode, the ChannelMaster accepts an external digitally modulated signal with QPSK, 8PSK, 16QAM, 8VSB, COFDM, DVBS and multi-level FSK. We also offer internal FM, COFDM, VSB, and DVBS (*future*).

The rugged ChannelMaster TX1 includes video and audio processing boards, power supply, 70 MHz modulator, power amplifier, up-converter, and low noise frequency synthesizer enclosed in a weatherproof enclosure that typically mounts on a tripod. See Figure 1–1 for the system block diagram.

The antenna (*supplied separately*) can be either mounted directly to the transmitter using one of our available mounting adapters, or can be remotely mounted to the transmitter and connected via standard RF cables with N-Type connectors. Many state-of-the-art options are available on the ChannelMaster, some not found on any other portable Transmitters, leading to a more cost-effective approach to portable Microwave Systems.

The Nucomm ChannelMaster TX1 Series of transmitters are available in single, dual, and multi-band models.

The ChannelMaster TX1 series radios provide full coverage of the 2, 7, & 13 GHz US frequency bands and/or other bands as required internationally, from 1 GHz to 15.5 GHz. The US frequency bands are given in Table 1 through Table 5. Band and channel selections are made and clearly displayed via the Front Panel LCD Interface.

#### Prime Power

All ChannelMaster TX1 transmitters feature a built-in power supply, which operates on power ranging from 90 to 240 VAC (*40 to 60Hz*), **or** +11 to +32 VDC without the need for internal jumpers or switch settings.

#### Audio Sub-carriers

Two (*four optional*) field programmable synthesized audio sub-carriers feature individual LINE/OFF/TONE source selection, and automatic gain control (AGC). The sub-carrier frequencies, Mode, and additional gain are front panel adjustable using the LCD interface.

#### Standby Mode

In the *Standby* mode, the ChannelMaster TX1 is powered on, but the RF output is muted, enabling the transmitter to be tuned safely without radiating *off-frequency* emissions. The ChannelMaster TX1 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 a lock when the unit is switched from *Standby* mode 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 function is intended as an approximate reading of power only.*)

### Video Presence Detector

The Video Presence Remote Standby mode enables the camera operator to remotely turn on the color bars or put the ChannelMaster TX1 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 Gain Control for audio inputs (*Two audio sub-carriers standard, four optional*)
- RS232/RS485 Remote
- Power Adjustments
- Analog/Digital Operation
- Field Programmable RF and ASC settings

## 2.2 Physical Description

The ChannelMaster TX1 measures 7.5 inches (*19.05 cm*) wide by 5.0 inches (*12.7 cm*) high by 13.25 inches (*33.65 cm*) deep. It features a robust housing design to withstand rough handling in

the field. The case is weather-resistant, and all connectors are weatherproofed.

## 2.3 Options

- Test Pattern/ID Test Generator with:
  - SMPTE RS-170A Color Bars (*EBU Pattern*)
  - A 16-character programmable ID (*can be placed in the Vertical Interval and Gen-locked to the incoming Video signal*)
- Remote Control Software allowing the ChannelMaster TX1 to be fully monitored and controlled from an IBM Compatible PC through a RS232C/RS485 port.
- High Power Amplifier enabling enhanced MER.

## 2.4 Accessories

ChannelMaster TX1 transmitters ship with AC & DC power cords and manual.

With the addition of a modem, the ChannelMaster can pass DS3/E3 or a variety of other digital signals. The ChannelMaster can accept PSK, QPSK, 8PSK, DVB-S, Multi-Level FSK, 16QAM, and COFDM signals directly through the 70 MHz input connector with no internal modifications.

Nucomm also offers a full line of antennae and antenna mounting equipment that seamlessly integrate with the ChannelMaster series.

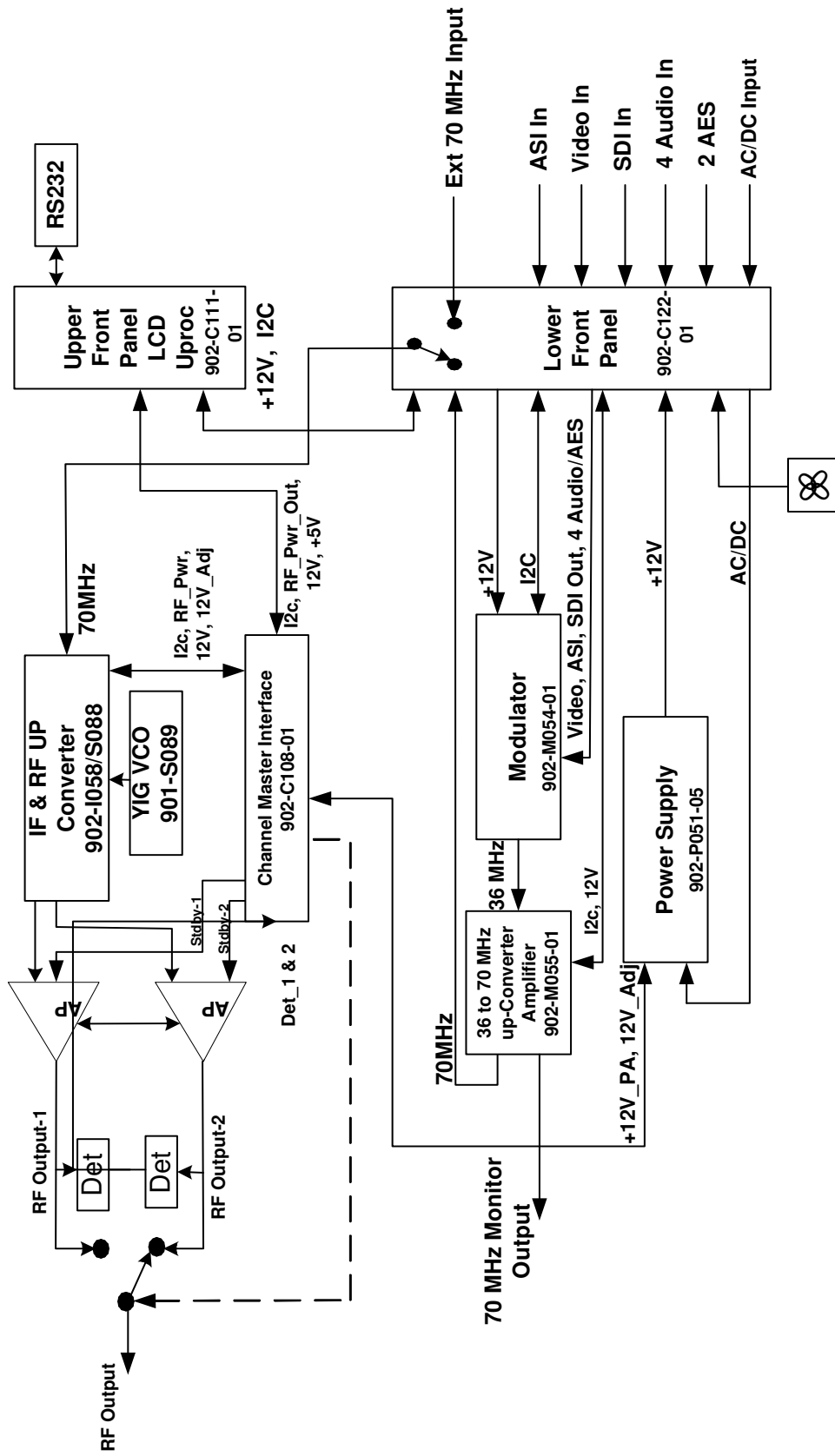


Figure 2-1 ChannelMaster TX1 Block Diagram



### 3. SPECIFICATIONS & FREQUENCY PLANS

**Table 3-1 ChannelMaster TX1 Specifications**

#### **RF Performance:**

Frequency Bands:.....	bands from 1.9 GHz to 13.25 GHz available ( <i>higher frequencies pending</i> ). Multi-band models available. Please contact Nucomm for specifics.
Tuning step size: .....	250 kHz ( <i>US</i> ), 100 kHz ( <i>International</i> )
70 MHz input:.....	-10 dBm to 0 dBm (75 $\Omega$ )
Frequency stability: .....	$\pm 5$ ppm (.0005%)

#### **Power Output**

##### **Standby mode:**

Standby: .....	No RF output
Normal: .....	HI power = Full power
.....	LOW power = 3.5 dB drop ( <i>typical</i> )

#### **Modulation Modes**

Standard selectable:

Modulation 1: .....	COFDM: QPSK, 16QAM, 64 QAM
Code Rate: .....	1/2, 2/3, 3/4, 5/6 and 7/8
Guard Interval: .....	1/32, 1/16, 1/8, 1/4,
Bandwidth: .....	6 MHz, 7 MHz, and 8 MHz
Number of Audios:.....	Two audio standard; Four audio available
Data Rates: .....	to 32 Mbps

Modulation 2: Analog FM

Two field tunable sub-carriers; 4 available

Analog Modulation Deviation, selectable: .....3 MHz/volt or 4 MHz/volt

Modulation 3: ..... VSB: 2VSB, 4VSB, 8VSB, 8VSBT

(*Other modulation formats available with optional download.*)

#### **Video & Digital Input Performance:**

Video: .....	525/625 lines NTSC/PAL field selectable
Pre-emphasis: .....	( <i>Analog</i> ) NTSC/PAL-B,G or M LCD selectable ( <i>CCIR 405</i> )
Video Low-Pass-Filter LCD selectable: .....	3.9 MHz, 4.5 MHz, 4.75 MHz, and 5.6 MHz
Frequency Response: .....	$\pm 0.25$ dB ( <i>10 Hz to video filter selected</i> )
Base-Band Response: .....	$\pm 0.50$ dB ( <i>10 Hz to 9 MHz</i> )
Signal-to-noise ratio: .....	69 dB typical ( <i>65 dB minimum</i> )
Differential Phase: .....	$\pm 1.0$ degrees
Differential Gain: .....	$\pm 1.0$ %
SDI Video: .....	SMPTE 259M Level C De-Embedded Audio
DVB-ASI: .....	Data Rates to 31.66845 Mbps
Input impedance: .....	75 $\Omega$
Return loss:.....	-26 dB ( <i>10 Hz to 5 MHz</i> )

**Table 3-1. ChannelMaster TX1 Specifications***(Continued)***Audio Performance:**

Standard: ..... 2 line audio and 1 digital AES/EBU inputs  
 Available: ..... 4 line audio and 2 digital AES/EBU inputs  
*(audios can be analog, AES/EBU or SDI De-embedded)*

**Analog Audio Mode**

Sub-Carriers: ..... selectable and field tunable from front panel;  
 Tunable in 5 kHz steps 4.8 MHz to 9.0 MHz

**Frequency Response:**

30 Hz to 10 kHz: ..... 0.5 dB

10 kHz to 15 kHz: ..... 1.0 dB

Deviation: ..... 75 kHz peak at 1 kHz (*100 kHz for PAL*)

Pre-emphasis: ..... 75  $\mu$ s & 50  $\mu$ s LCD selectable

**Digital Audio Mode:**

Frequency Response:..... 30 Hz to 20 kHz: 0.5 dB

**Digital & Analog Modes:****Line output:**

US:..... +8 dBm, 600  $\Omega$  for 75 kHz peak deviation

International:..... +12 dBm, 600  $\Omega$  for 100 kHz peak deviation

**Signal-to-noise:**

Line audio: ..... 65 dB

**Harmonic distortion:**

Line audio:..... 0.5% maximum (*typically 0.2%*)

**Remote Control:**..... RS-232/RS-485; 9 Pin "D"

**Power Requirements:**..... AC 90 to 240 VAC **or** +11 to +32 VDC.

**Environmental:****Temperature range:**

Full specification:.....  $-30^{\circ}$  to  $+60^{\circ}$  C

Storage: .....  $-40^{\circ}$  to  $+80^{\circ}$  C

Humidity: ..... 0 to 95% non-condensing



### Table 3-1. ChannelMaster TX1 Specifications

(Continued)

#### **Physical Characteristics:**

Size (Low Pwr Unit): ..... 4.89" (12.42 cm) x 7.5" (19.05 cm) x 12.0"  
(30.48 cm)

Size (Hi Pwr Unit): ..... 5.2" (13.21 cm) x 7.5" (19.05 cm) x 12.0"  
(30.48 cm)

#### Weight:

Single-Band (2 GHz), Low-Power: ..... 15.25 lbs (6.86 kg)

Duale-Band (2/7 GHz), Low-Power: .. 16.50 lbs (7.43 kg)

Single-Band (2 GHz), High-Power: .... 15.75 lbs (7.09 kg)

Duale-Band (2/7 GHz), High-Power:... 17.00 lbs (7.65 kg)

#### **Connectors:**

Video / SDI / DVB-ASI / 70MHz IF: ..... Type BNC-F

RF Output: ..... Type "N-F" RF Head

Audio: ..... Multi-pin, Detronics DT02H-14-15PN  
(XLR break-out cable provided)

Power: ..... Multi-pin MS Type, Detronics DT02H-14-18PN  
(XLR break-out cable provided)

Remote Control: ..... 9 Pin "D" Female

#### **Case:**

Ruggedized to withstand rough handling in the field with handles that protect controls from damage. Case is weather-resistant and all connectors are weatherproofed.

### 3.1 Frequency Plans (USA)

The standard US frequency plans apply to all units sold into markets covered by the FCC. Frequency plans for all systems sold into non-US markets are individualized to meet specific customer requirements and licensing restrictions, as specified at the time of purchase.

<b>CHANNEL / FREQUENCY PLAN - CHART NO: 326</b>		
<b>2 GHz (17 MHz)</b>		
<b>(Frequency Range 1,994 MHz – 2,497 MHz)</b>		
<b>Channel</b>	<b>Offset</b>	<b>Receive Frequency MHz</b>
1	–	1,994.75
1	0	1,999.00
1	+	2,003.75
2	–	2,012.25
2	0	2,016.50
2	+	2,020.75
3	–	2,029.25
3	0	2,033.50
3	+	2,037.75
4	–	2,046.25
4	0	2,050.50
4	+	2,054.75
5	–	2,063.25
5	0	2,067.50
5	+	2,071.75
6	–	2,080.25
6	0	2,084.50
6	+	2,088.75
7	–	2,097.25
7	0	2,101.50
7	+	2,105.75
8	–	2,454.25
8	0	2,458.50
8	+	2,462.75
9	–	2,471.00
9	0	2,475.25
9	+	2,479.50
10	–	2,487.50
10	0	2,491.75
10	+	2,496.00

Table 3-2: Frequency Plan (US), 2GHz 17MHz

<b>CHANNEL / FREQUENCY PLAN - CHART NO: 326</b>		
<b>2 GHz (12 MHz)</b>		
<b>(Frequency Range 2,025 MHz – 2,496 MHz)</b>		
<b>Channel</b>	<b>Offset</b>	<b>Receive Frequency MHz</b>
1	-	2,028.50
1	0	2,031.50
1	+	2,034.50
2	-	2,040.50
2	0	2,043.50
2	+	2,046.50
3	-	2,052.50
3	0	2,055.50
3	+	2,058.50
4	-	2,064.50
4	0	2,067.50
4	+	2,070.50
5	-	2,076.50
5	0	2,079.50
5	+	2,082.50
6	-	2,088.50
6	0	2,091.50
6	+	2,094.50
7	-	2,100.50
7	0	2,103.50
7	+	2,106.50
8	-	2,454.25
8	0	2,458.50
8	+	2,462.75
9	-	2,471.00
9	0	2,475.25
9	+	2,479.50
10	-	2,487.50
10	0	2,491.75
10	+	2,496.00

Table 3-3: Frequency Plan (US), 2GHz 12MHz

<b>CHANNEL / FREQUENCY PLAN - CHART NO: 326</b>		
<b>(Frequency Range 6,431 MHz – 7,119 MHz)</b>		
<b>Channel</b>	<b>Offset</b>	<b>Receive Frequency MHz</b>
1	–	6,881.25
1	0	6,887.50
1	+	6,893.75
2	–	6,906.25
2	0	6,912.50
2	+	6,918.75
3	–	6,931.25
3	0	6,937.50
3	+	6,943.75
4	–	6,956.25
4	0	6,962.50
4	+	6,993.75
5	–	6,981.25
5	0	6,987.50
5	+	6,993.75
6	–	7,006.25
6	0	7,012.50
6	+	7,018.75
7	–	7,031.25
7	0	7,037.50
7	+	7,043.75
8	–	7,056.25
8	0	7,062.50
8	+	7,068.75
9	–	7,081.25
9	0	7,087.50
9	+	7,093.75
10	–	7,106.25
10	0	7,112.50
10	+	7,118.75
11	–	6,431.25
11	0	6,437.50
11	+	6,443.75
12	–	6,456.25
12	0	6,462.50
12	+	6,468.75
13	–	6,481.25
13	0	6,487.50
13	+	6,493.75
14	–	6,506.25
14	0	6,512.50
14	+	6,518.75

Table 3-4: Frequency Plan (US), 7GHz

<b>CHANNEL / FREQUENCY PLAN - CHART NO: 10</b> <b>(Frequency Range 12,706MHz - 12,950MHz)</b>		
<b>Channel</b>	<b>Offset</b>	<b>Receive Frequency MHz</b>
1	-	12,706.25
1	0	12,712.50
1	+	12,718.75
1	++	12,725.00
2	-	12,731.25
2	0	12,737.50
2	+	12,743.75
2	++	12,750.00
3	-	12,756.25
3	0	12,762.50
3	+	12,768.75
3	++	12,775.00
4	-	12,781.25
4	0	12,787.50
4	+	12,793.75
4	++	12,800.00
5	-	12,806.25
5	0	12,812.50
5	+	12,818.75
5	++	12,825.00
6	-	12,831.25
6	0	12,837.50
6	+	12,843.75
6	++	12,850.00
7	-	12,856.25
7	0	12,862.50
7	+	12,868.75
7	++	12,875.00
8	-	12,881.25
8	0	12,887.50
8	+	12,893.75
8	++	12,900.00
9	-	12,906.25
9	0	12,912.50
9	+	12,918.75
9	++	12,925.00
10	-	12,931.25
10	0	12,937.50
10	+	12,943.75
10	++	12,950.00

Table 3-5: Frequency Plan (US), 12GHz

<b>CHANNEL / FREQUENCY PAN - CHART NO: 10</b>		
<b>(Frequency Range 12,976MHz - 13,250MHz)</b>		
<b>Channel</b>	<b>Offset</b>	<b>Receive Frequency MHz</b>
1	-	12,956.25
1	0	12,962.50
1	+	12,968.75
1	++	12,975.00
2	-	12,981.25
2	0	12,987.50
2	+	12,993.75
2	++	13,000.00
3	-	13,006.25
3	0	13,012.50
3	+	13,018.75
3	++	13,025.00
4	-	13,031.25
4	0	13,037.50
4	+	13,043.75
4	++	13,050.00
5	-	13,056.25
5	0	13,062.50
5	+	13,068.75
5	++	13,075.00
6	-	13,081.25
6	0	13,087.50
6	+	13,093.75
6	++	13,100.00
7	-	13,106.25
7	0	13,112.50
7	+	13,118.75
7	++	13,125.00
8	-	13,131.25
8	0	13,137.50
8	+	13,143.75
8	++	13,150.00
9	-	13,156.25
9	0	13,162.50
9	+	13,168.75
9	++	13,175.00
10	-	13,181.25
10	0	13,187.50
10	+	13,193.75
10	++	13,200.00
11	-	13,206.25
11	0	13,212.50
11	+	13,218.75
11	++	13,225.00
12	-	13,231.25
12	0	13,237.50
12	+	13,243.75
12	++	13,250.00

Table 3-6: Frequency Plan (US), 13GHz

## 4. INSTALLATION

### 4.1 Unpacking and Inspection

Unpack and visually inspect the unit for LCD, connectors, and surface area damage. All claims should be filed with the carrier. Save all shipping and packing materials for possible re-use.

### 4.2 Pre-Installation Checkout

Connect the ChannelMaster RF output through a 30 watt, 30 dB attenuator to a spectrum analyzer. Verify the output frequency and level correspond directly to the transmitter front panel settings.

### 4.3 Mechanical Installation

The unit ships pre-assembled and requires no mechanical installation other than cabling. Optional accessories such as Triax cable, tripod, direct mounting antenna, or rack/vehicle mounting kits, are shipped with necessary instructions.

### 4.4 Electrical Installation

The unit front and back panels are shown in Figure 4-1 and Figure 4-2. Connector details are shown in [Figures 4-3](#) to 4-5.

#### Power Connection (1)

The built-in power supply accepts 90 to 240 VAC (40 to 60 Hz) **or** +11 VDC to +32 VDC without requiring any jumper or switch settings. See [Figure 4-5](#).

Nucomm ships a DC cable, and the appropriate local AC line cord. Alternate line cords are available upon request.

**Optional "Standby" Power feature:**  
For power redundancy, the unit can be configured to accept both AC **AND** DC.

### ASI, SDI, Composite & 70MHz ports

All video inputs are made via 75  $\Omega$  BNC coaxial cables to the appropriate, clearly marked, front panel port.

ASI (to 31.66845 Mbps) or SDI signals are input via the ASI IN (2) or SDI IN (3) ports. Composite or Baseband video is input via VIDEO IN (4). 70 MHz is input via the 70 MHz IN port (5). Select the appropriate input type via the front panel interface. See Section 5 for details.

Optionally, the unit can be fitted with an ASI OUT port (not shown), for use as a standalone ASI encoder.

### AUDIO Inputs (6)

All audio inputs are made via this connector. See [Figure 4-4](#). The Digital AES/EBU inputs are on Audios 1 & 3. Only one Digital audio is available in the standard "two audio" configuration.

### RS232 connector (left side of unit)

This port is for control and monitoring via RS232 or RS485. See [Figure 4-3](#).

### RF OUTPUT (7)

RF output is via a Type-N connector at the rear of the unit. Directly connect a suitable antenna, or a 50  $\Omega$ , low-loss coaxial cable (such as RG-214U) between the RF Output and the antenna connector.

### POWER SWITCH and FUSES (8)

The unit has AC & DC fuses. The AC fuse is 2.5 Amps (fast blow). The DC fuse is 10 Amps (fast blow).

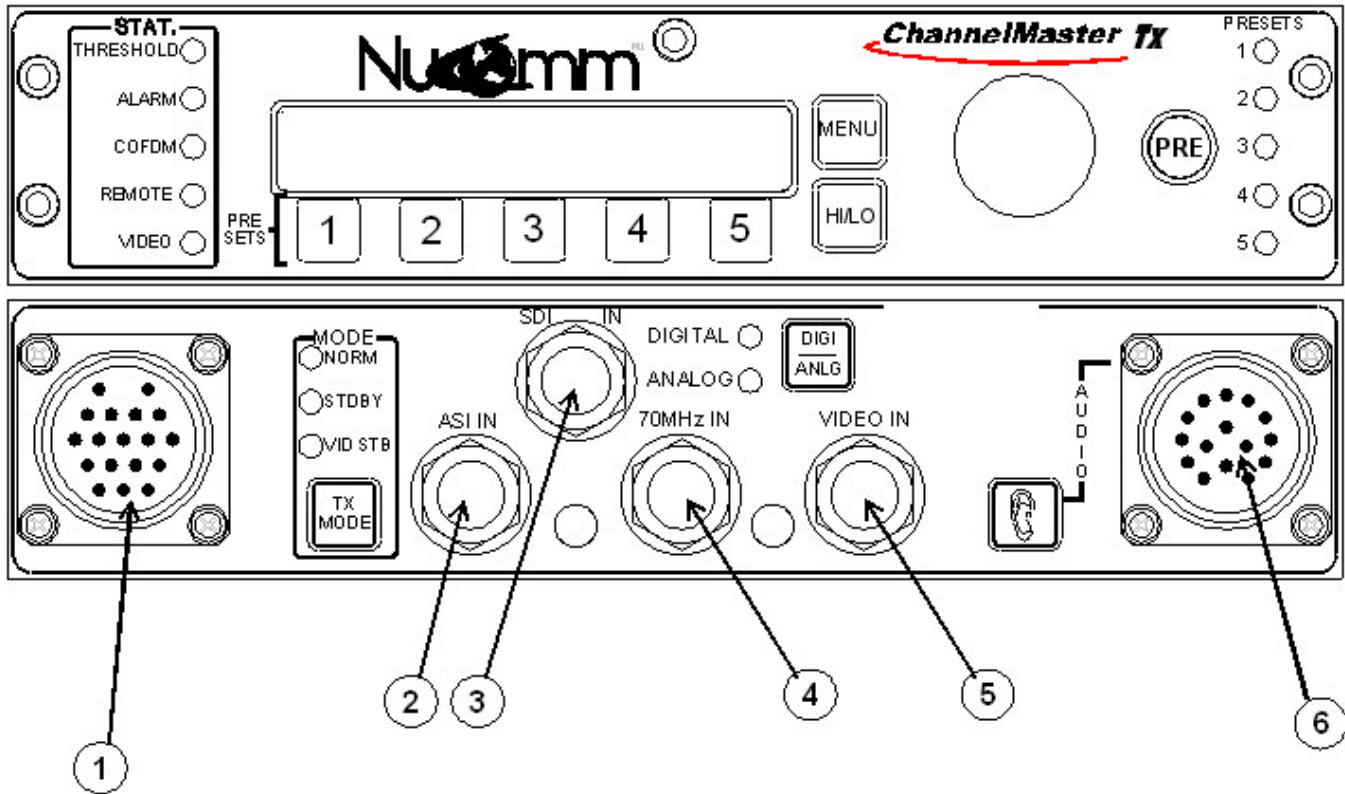


Figure 4-1 ChannelMaster TX1 Front Panel

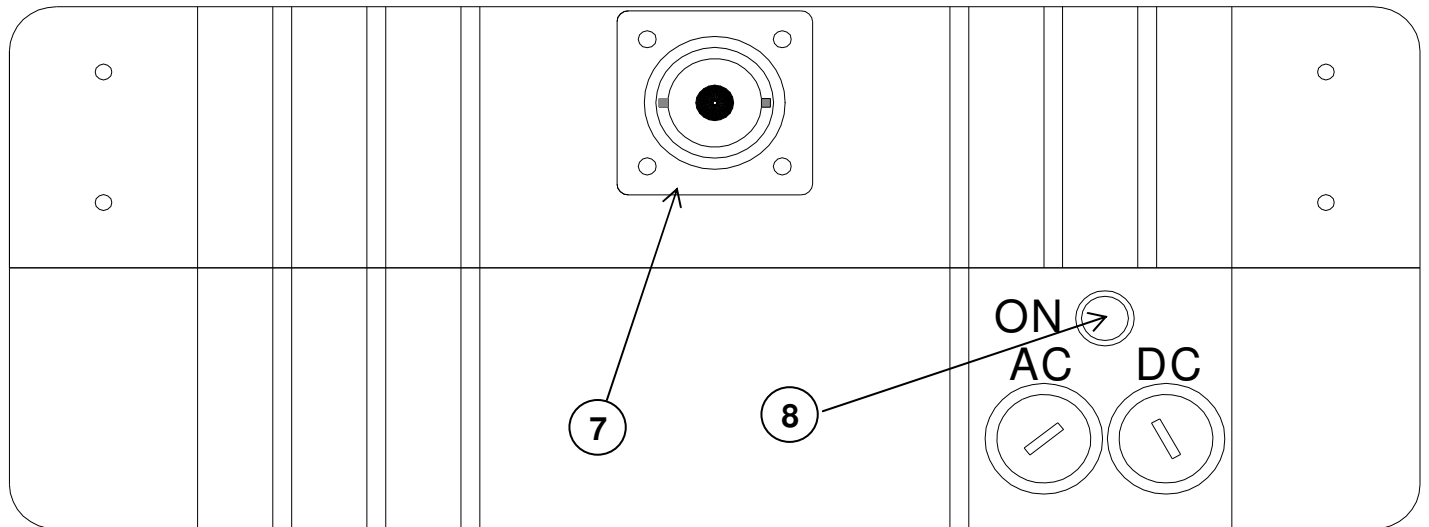
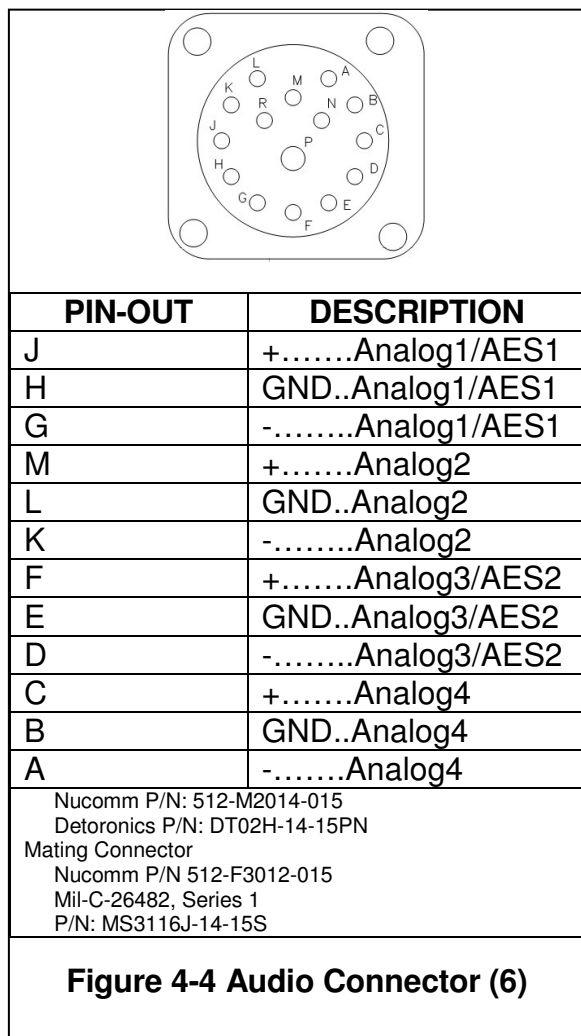
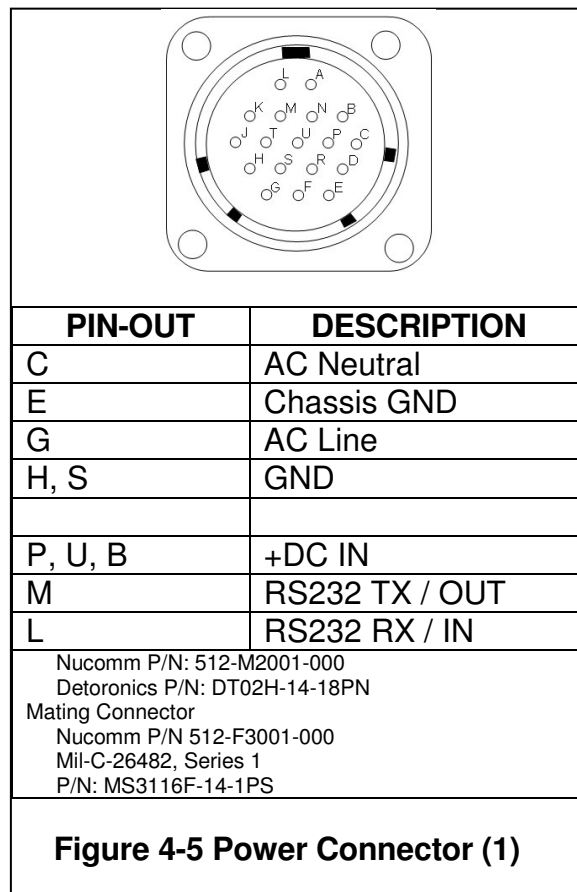
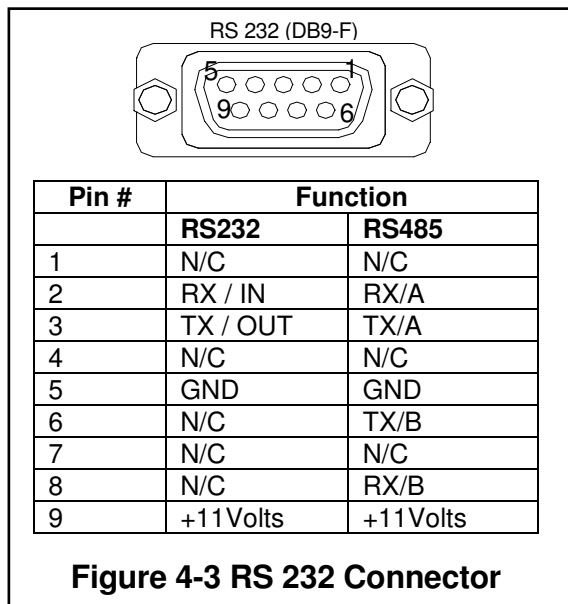
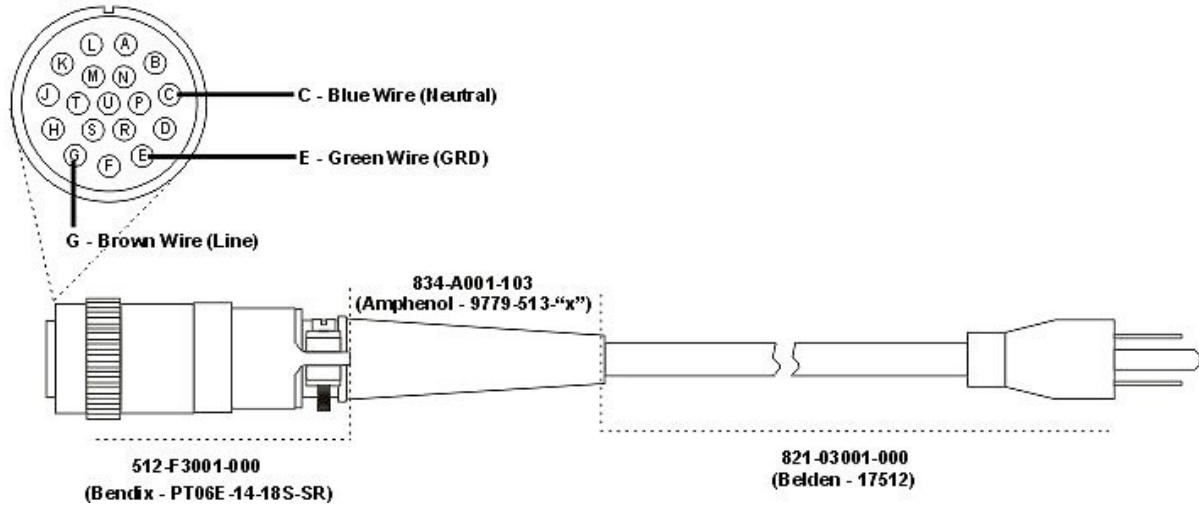


Figure 4-2 ChannelMaster TX1 Rear Panel



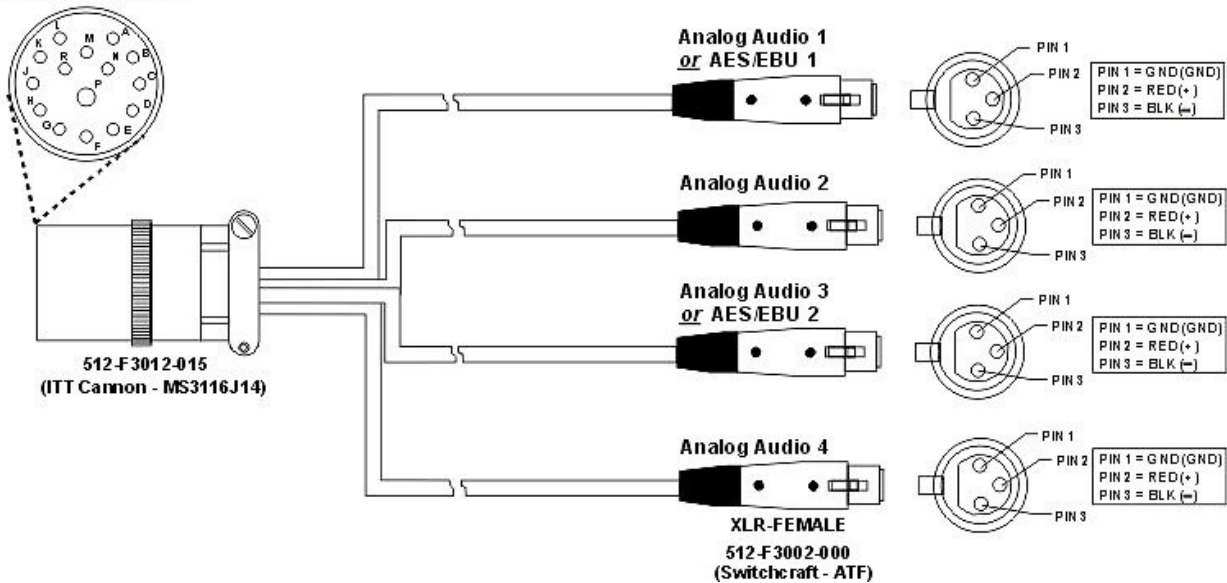


**WIRE ENTRY VIEW**



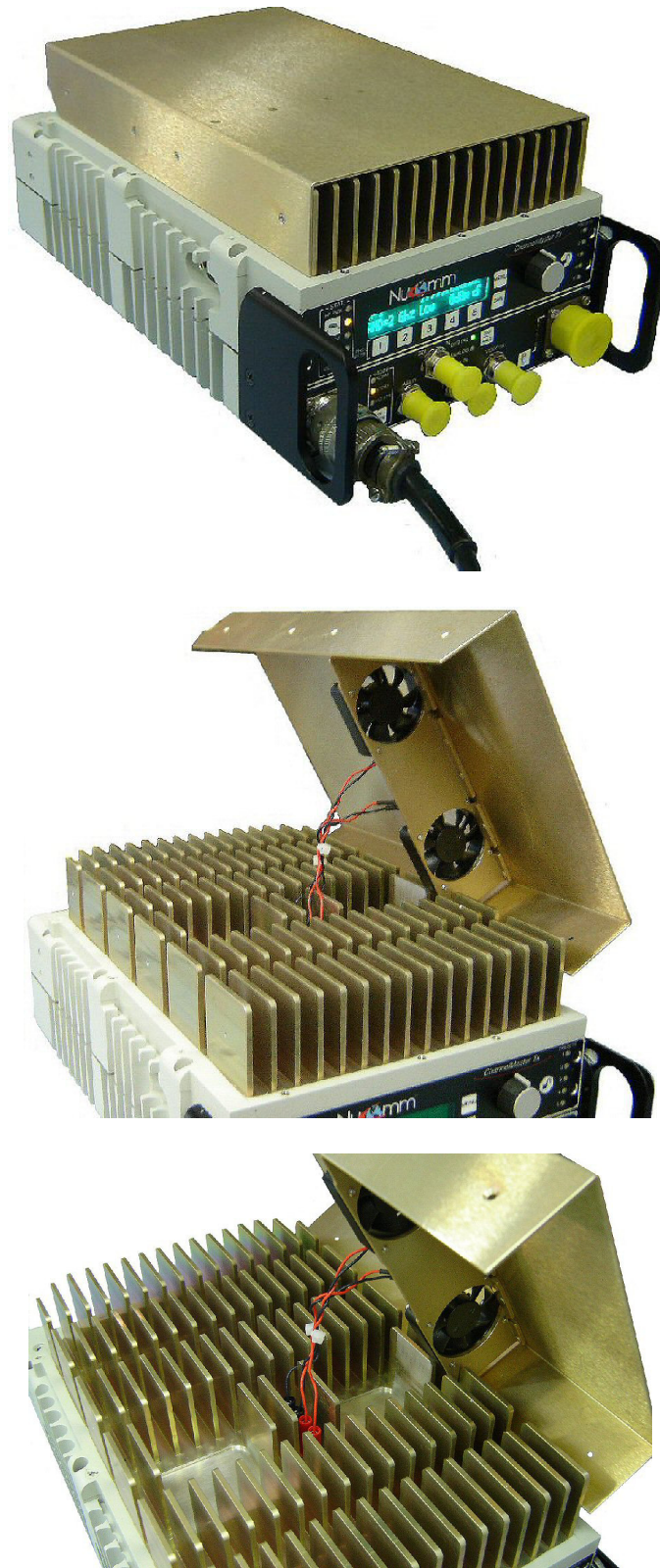
**Figure 4-6 AC Line Cord Construction**

**WIRE ENTRY VIEW**



<b>CM Transmitter Audio Cable</b>	
<b>PIN-OUT</b>	<b>DESCRIPTION</b>
J	+.....Analog1/AES1
H	GND..Analog1/AES1
G	-.....Analog1/AES1
M	+.....Analog2
L	GND..Analog2
K	-.....Analog2
F	+.....Analog3/AES2
E	GND..Analog3/AES2
D	-.....Analog3/AES2
C	+.....Analog4
B	GND..Analog4
A	-.....Analog4

**Figure 4-7 Audio Cable Construction**



**Figure 4-8 High Power Unit Detail**

## 5. OPERATION

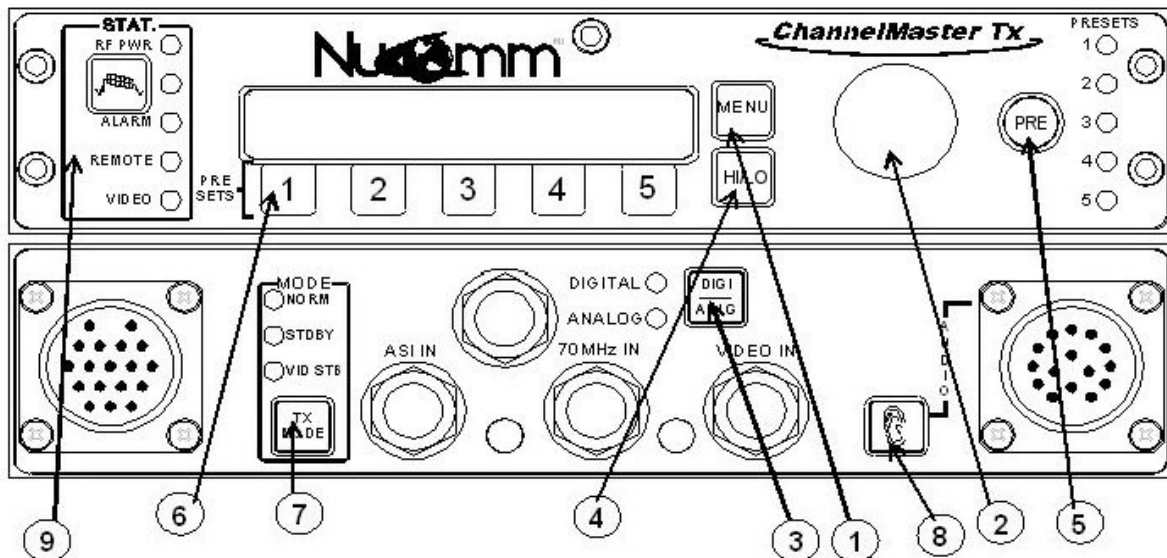


Figure 5-1: ChannelMaster TX1 Front Panel Controls and Indicators

### 5.1 Power Up

Upon powering up the unit, you will see three quick screens showing the equipment type, the model number, and the serial number. After that, the unit will display the DEFAULT screen, which will look similar to the following photo (*depending on your configuration*).



Once this screen appears, options and settings can then be changed and initialized through the use of the front panel "Quick-Keys" and pre-set buttons, or via the menu system. The front panel of the unit is depicted in Figure 5-1.

Menu navigation is via the rotary "**Quick Knob**" switch (2) to the right of the LED display. Turn the "Quick Knob" clockwise or counter-clockwise to move the cursor through the menus. By

pressing the "Quick Knob", you are able to select, or activate, menu items. As such, the "Quick Knob" may also be referred to as the "Enter" button.

#### 5.1.1 Changing Characters

1. Begin by rotating the "Quick Knob" until the desired screen item is highlighted. Press Enter to select the item.
2. The left-most character position of the name will then be highlighted. Rotate the "Quick-Knob" until the desired alpha-numeric character appears.
3. Press the "Quick-Knob" to save the character.
4. Move the cursor to the second character, rotating the "Quick-Knob".
5. Press the "Quick-Knob" to select the character.
6. Rotate the "Quick-Knob" until the desired alpha-numeric character appears.

7. Again, Press the “Quick-Knob” to save the character.
8. Repeat Steps 2 thru 7 until either the desired name is assigned or all character positions are filled.

On certain screens (as with system settings), an arrow is used to show the current setting, as in the following where "SDI" is currently set:



**Note the highlighted arrow at the bottom left of the screen.** This highlighting is the "cursor", and indicates an item that is ready to be selected.

**Note:** After one minute of inactivity the display reverts to the DEFAULT screen, and any un-activated selections are discarded.

## 5.2 Button Operation

### Set Modulation Mode (3)

The ChannelMaster TX1 modulation mode is set to ANALOG or DIGITAL, based on the Modulation Mode selected on the front panel through the use of the “DIGI\_ANLG” Button.



Pressing the “DIGI\_ANLG” Button, immediately switches the ChannelMaster TX1 from the one mode to the other (from Digital to Analog, or from Analog to Digital Mode). This is made apparent from the Input LED's (located next to the button) and a text message displayed on the LCD.



**Switching to Digital Mode**

When digital modulation is selected, the available input selections will be:

**Composite** - The signal is converted to digital via the MPEG Encoder and routed to the digital modulator.

**SDI** - The signal routes through the MPEG Encoder and then to the digital modulator.

**External 70 MHz Digital** - This input bypasses the encoder and modulator, and routes to the heterodyne up-converter.

**ASI** - Input bypasses the Encoder and goes to the digital modulator. (The ASI rate must be at or below the maximum digital modulation rate.)



**Switching to Analog Mode**

**When analog modulation is selected,** the available input selections will be:

**Composite** - The composite signal is routed through the internal low pass filter (*bandwidth  $\pm 4.0$  MHz NTSC,  $\pm 5.6$  MHz PAL typical.*) then sent to the FM modulator.

**SDI** - Internal circuits convert SDI inputs to Composite. The signal is then processed as Composite.

**External 70 MHz FM** - This input bypasses the modulator, and routes to the heterodyne up-converter.

#### Set Power Level (4)

The user can toggle between HI or LOW power by merely pressing the “HI/LO” Button.



The LCD will then immediately display the change at the bottom right corner.



Unit in Low Power Mode



#### 5.2.1 Changing Operating Frequency

1. Ensure that the Main Menu screen is displayed on the LCD.
2. Rotate the “Quick-Knob” to highlight the preset parameter to be changed.
3. Press the “Quick-Knob” to enter the selection.
4. Rotate the “Quick-Knob” to adjust the value of the selection.

5. Press the “Quick-Knob” to enter the changed value.
6. Rotate the “Quick Knob” until the digit that needs to be changed is highlighted.
7. Press “Enter”.
8. Change the digit as needed.
9. Press “Enter”.
10. Repeat until all digits are correct.
11. When all digits are correct, move the cursor to the end of the frequency where it says “GHz”.
12. Press “Enter”.

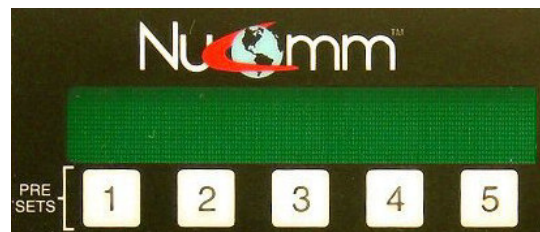
When the operating frequency is changed, the unit goes into standby while the synthesizer re-tunes to the new frequency. Transmission resumes when the new frequency is reached.

#### 5.3 Presets

There are 15 Channel Presets. These Presets are either changed or recalled through the numbered “Preset” Buttons, **or** through the “PRE” Button.

The numbered Preset Buttons are pa1 through pa5, located just below the LCD. These five numbered preset keys are provided to rapidly store and recall five custom configurations without button operation.

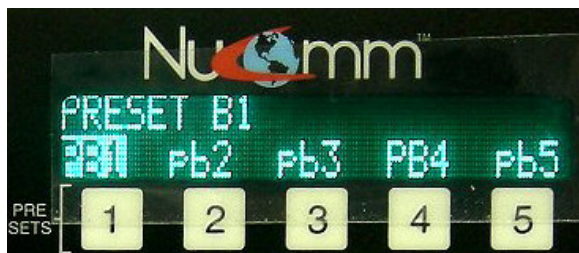
Accessing the remaining presets requires using the “PRE” Button.





### “PRE” Button

As well as also bringing up the first group of presets (*pa1 – pa5*), the other two sets of presets are only accessible through the “PRE” (*Preset*) Button. Pressing the “PRE” Button once brings up the presets *pa1 – pa5*. Pressing the “PRE” Button twice, brings up the presets *pb1 – pb5*. Pressing the “PRE” Button three times, brings up the presets *pc1 – pc5*.



These presets are set and saved in the same way as the *numbered* “Preset” Buttons.

### Changing & Setting Preset Parameters.

Before saving a preset, program the radio with the desired parameters.

To change these parameters, refer to Section 5.2.1 or 5.5.

**For Presets *pa1 – pa5***, simply press & hold the numbered button just below the desired preset to save it.



**Press & hold numbered button below the desired preset to save it.**

**For Presets *pb1 – pb5*, & *pc1 – pc5***, press the “PRE” Button the appropriate amount of times to bring up the set containing the desired preset. Rotate the “Quick-Knob” until it highlights the desired preset, and press & hold the “Quick-Knob” to save it until the confirmation message is displayed (*approximately 4 seconds*).

When a preset is saved, all system parameters are stored into memory with the associated preset. These parameters include:

- Modulation Parameters
- Input Type
- Power Mode
- Channel Number & Frequency
- Audio Settings

The ChannelMaster LCD indicates which of the presets have been programmed as well as those that have not been programmed. All presets represented by *capital letters* have been programmed.



All presets represented by *lowercase letters* have not been programmed.

Example:

- PA1 - **has** been programmed.
- pa1 - **has not** been programmed.

### Changing & Setting Preset Name

Each preset can be given a name up to 16 characters long. The name can consist of alpha-numeric characters only (*characters A – Z & 1 – 9*). The preset, however, **must have** the channel, frequency, and band saved first before it can be assigned a name.

To assign a name to a preset, perform the following:

1. From any menu screen, press the “PRE” Button the appropriate amount of times to bring up the set containing the desired preset.
2. Rotate the “Quick-Knob” to highlight the preset to be assigned a name.
3. Press the “Quick-Knob” to enter the selection.
4. Rotate the “Quick-Knob” until the name area is highlighted.
5. Press the “Quick-Knob” to enter the selection. (Refer to Section 5.1.1 for **Changing Characters**.)



**Highlighted Name Area**

6. When completed, move the cursor over the arrow at the bottom-right.



7. Press the “Quick-Knob” to select the arrow. The name has now been saved.

### Recalling A Preset

Briefly press the preset to recall settings. When any of the **first five Presets** have been recalled, the associated Preset LED will illuminate.



**Preset 1 recalled**

**NOTE:** If the unit is enabled for **Presets Lock RF CHN**, the frequency cannot be changed by a preset and will remain the current operating channel.

### TX MODE (7)

The TX MODE key is used to select from the following operating modes:

- **NORMAL:** Transmitter is active, with or without a video (*or composite*) input signal.
- **STANDBY:** Transmitter is in STANDBY until switched to another mode. Frequency synthesizer is locked on frequency.



### AUDIO Quick Key (8)

The AUDIO quick key provides a shortcut to the audio settings.

When modulating digitally, the system will display the Encoder's audio settings

as if you had selected the following menu items: **Menu>Encoder>Audio**. (Refer to Section 5.5; **Encoder Menu Selections**.)

When modulating in analog, the system displays the FM audio settings, as if the following items were selected: **Menu>Modulation> Parameters> FM> Audio**. (Refer to Section 5.5; **FM**.)



#### 5.4 Status Indicators (9)

The following show the unit's status:

**RF (Green):** RF present at output port.

**Color Bars:** Color Bars are active.

**Alarm (Red):** Indicates an improper setting or a module failure. The exact reason for the alarm can be determined from the Alarm section of the Main Menu.

**Remote:** Unit is under remote control.

**Video (Green):** Indicates that video is present.

#### 5.5 Main Menu Selections

The user can customize the ChannelMaster TX1 operation (*rather than using the factory defaults*) through the Main Menu. After pressing the Main Menu Button, the Main Menu Screen will appear.



From the **Upper Level Menu**, the user can select one of six sub-menus to access. They are:

- **Input Menu**
- **Modulation Settings Menu**
- **Encoder Settings Menu**
- **System Settings Menu**
- **Monitoring Menu**
- **Alarms (Current)**



#### Input Menu Selections

The **Input Menu** works in conjunction with the DIGI\_ANLG (*Digital/Analog*) Button. Once the type of modulation is chosen, the operator then uses the Input Menu to manually select the input source that is to be made active.

As previously discussed in Section 5.2, the Digital inputs consist of:

- **Composite**
- **SDI**
- **External 70 MHz**
- **ASI**

As previously discussed in Section 5.2, the Analog inputs consist of:

- **Composite**
- **SDI**
- **External 70 MHz**

Remember, only one input can be made active at any time. Only the Input Menu can select the active input, regardless of whether there are signals present on any of the input connectors,

### Modulation Menu Selections

The **Modulation Menu** establishes the operating parameters for both Analog and Digital modulation schemes. The Modulation Menu has two sub-menus:

- **Mode Select.**
- **Parameter Setup.**

**Mode Select** is used strictly for selecting the type of **Digital Modulation** to be utilized by the TX1. Choices are COFDM, DVB-S, and VSB.

**Parameter Setup** allows the user to change or adjust the various parameters affecting the different modulation types. These parameters are for:

- **FM**
- **COFDM**
- **DVB-S (Future)**
- **VSB**

### FM

For FM (*Analog*), there are two sub-categories: Audio, and Video.



Under the FM **Audio** sub-menu, the user can choose between any one of four Analog audio channels (*SC1L*, *SC1-R*, *SC2-L*, & *SC2-R*) and change any of the following:

- **Input:** *Off, Line, Tone, AES/EBU, and Embedded*
- **Insertion:** *Adjusts from -40 dB to -20 dB; (default -28 dB.)*
- **Gain:** *Adjusts from -6 dB to +6 dB; (default 0.0 dB)*
- **Nextel Frequency Band:** *Adjusts sub-carrier frequency - (Refer to table in Section 5.7.1 - Audio Sub-carrier Frequencies.)*

(Refer to Section 5.2.1: **Changing Operating Frequency.**)

If **LINE** is selected, the unit accepts balanced 600  $\Omega$  inputs at +8 dBm Analog (*-10 dBu Digital*). At 1 kHz input, headroom is +18 dBm Analog (*0 dBu Digital*).



Under the FM **Video** sub-menu, the user can change any one of four selections. They are:

- **Inverse:** *Normal, Inverse*
- **Emphasis:** *Emphasis, Flat*
- **Filter:** *Bypass, 3.90 MHz, 4.50 MHz, 4.75 MHz, 5.60 MHz*
- **Deviation Bandwidth:** *(Display Only)*



### COFDM

For the **COFDM** (*Digital*) sub-menu, the following parameters can be changed:

- **Power:** On, Off
- **Constellation:** QPSK, 16QAM, 64QAM
- **Code Rate (error correction):** 1/2, 2/3, 3/4, 5/6, 7/8
- **Guard Interval (guard spacing - delay between intervals):** 1/32, 1/16, 1/8, 1/4.
- **Bandwidth:** 6 MHz, 7 MHz, 8 MHz

## 5.6 Data Rate

Use the following tables to identify the resulting Data Rate that will be set when selecting the ChannelMaster's Code Rate:

**(Modulation>Parameter Setup> COFDM >Code Rate)**

**Table 5-1 ChannelMaster 8 MHz B/W Data Rates**

Modulation System	Code Rate	Guard Interval			
		1/32	1/16	1/8	1/4
IF = 9.142857 MHz Clk=36.571429 Mbit/s		Flo = 60.857143 MHz		<b>BW = 8 MHz</b>	
<b>Data Rate (Mbit/s)</b>					
<b>QPSK</b>	1/2	6.032086	5.854671	5.529412	4.976471
	2/3	8.042781	7.806228	7.372549	6.635294
	3/4	9.048128	8.782007	8.294118	7.464706
	5/6	10.053476	9.757785	9.215686	8.294118
	7/8	10.55615	10.245675	9.676471	8.708824
<b>16-QAM</b>	1/2	12.064172	11.709342	11.058824	9.952942
	2/3	16.085562	15.612456	14.745098	13.270588
	3/4	18.096256	17.564014	16.588236	14.929412
	5/6	20.106952	19.51557	18.431372	16.588236
	7/8	21.1123	20.49135	19.352942	17.417648
<b>64-QAM</b>	1/2	18.096258	17.564013	16.588236	14.929413
	2/3	24.128343	23.418684	22.117647	19.905882
	3/4	27.144384	26.346021	24.882354	22.394118
	5/6	30.160428	29.273355	27.647058	24.882354
	7/8	31.66845	30.737025	29.029413	26.126472

**Table 5-2 ChannelMaster 7 MHz B/W Data Rates**

Modulation System	Code Rate	Guard Interval			
		1/32	1/16	1/8	1/4
IF = 7.999999875 MHz Clk=32.0000 Mbit/s		Flo = 62.000000125 MHz		<b>BW = 7 MHz</b>	
<b>Data Rate (Mbit/s)</b>					
<b>QPSK</b>	1/2	5.27807525	5.12283713	4.8382355	4.35441213
	2/3	7.037433375	6.8304495	6.45098038	5.80588225
	3/4	7.917112	7.68425613	7.25735325	6.53161775
	5/6	8.7967915	8.53806188	8.06372525	7.25735325
	7/8	9.23663125	8.96496563	8.46691213	7.620221
<b>16-QAM</b>	1/2	10.5561505	10.2456743	9.676471	8.70882425
	2/3	14.07486675	13.660899	12.9019608	11.6117645
	3/4	15.834224	15.3685123	14.5147065	13.0632355
	5/6	17.593583	17.0761238	16.1274505	14.5147065
	7/8	18.4732625	17.9299313	16.9338243	15.240442
<b>64-QAM</b>	1/2	15.83422575	15.3685114	14.5147065	13.0632364
	2/3	21.11230013	20.4913485	19.3529411	17.4176468
	3/4	23.751336	23.0527684	21.7720598	19.5948533
	5/6	26.3903745	25.6141856	24.1911758	21.7720598
	7/8	27.70989375	26.8948969	25.4007364	22.860663

**Table 5-3 ChannelMaster 6 MHz B/W Data Rates**

Modulation System	Code Rate	Guard Interval			
		1/32	1/16	1/8	1/4
IF = 6.85714275 MHz Clk=27.428571 Mbit/s		Flo = 63.14285725 MHz		<b>BW = 6 MHz</b>	
<b>Data Rate (Mbit/s)</b>					
<b>QPSK</b>	1/2	4.5240645	4.48248248	4.2334561	3.81011061
	2/3	6.03208575	5.854671	5.5294118	4.9764705
	3/4	6.786096	6.58650525	6.2205885	5.5985295
	5/6	7.540107	7.31833875	6.9117645	6.2205885
	7/8	7.9171125	7.68425625	7.2573533	6.531618
<b>16-QAM</b>	1/2	9.048129	8.7820065	8.294118	7.4647065
	2/3	12.0641715	11.709342	11.058824	9.952941
	3/4	13.572192	13.1730105	12.441177	11.197059
	5/6	15.080214	14.6366775	13.823529	12.441177
	7/8	15.834225	15.3685125	14.514707	13.063236
<b>64-QAM</b>	1/2	13.5721935	13.1730098	12.441177	11.1970598
	2/3	18.0962573	17.564013	16.588235	14.9294115
	3/4	20.358288	19.7595158	18.661766	16.7955885
	5/6	22.620321	21.9550163	20.735294	18.6617655
	7/8	23.7513375	23.0527688	21.77206	19.594854



## VSB

For the **VSB** (*Digital*) sub-menu, the following parameters can be changed:

- **Type:** 2VSB, 4VSB, 8VSB, 16VSB, 8TVSB
- **Bandwidth:** 6 MHz, 7 MHz, 8 MHz

BW = 6 MHz		Data Rate (Mbit/s)
VSB	2 VSB	9.7
	4/8T VSB	19.4
	8 VSB	29.1
	16 VSB	38.8

BW = 7 MHz		Data Rate (Mbit/s)
VSB	2 VSB	11.3
	4/8T VSB	22.6
	8 VSB	33.9
	16 VSB	45.3

BW = 8 MHz		Data Rate (Mbit/s)
VSB	2 VSB	12.9
	4/8T VSB	25.5
	8 VSB	38.8
	16 VSB	51.7

Note that the data rate for non-Trellis coded 4 VSB is the same as 8 VSB with Trellis coding.

8 VSB with Trellis coding @ 6MHz is the ATSC standard.

## VSB Data Rates

## Encoder Menu Selections

The **Encoder Menu** establishes the operating parameters for the MPEG 2 Encoder (*Digital*). The Encoder Menu has four active sub-menus:

- **Audio**
- **Video**
- **Table**
- **GOP**



Under the **Audio** sub-menu, the user can choose between Digital Audio Channel 1 and Digital Audio Channel 2 (*if active*). For each of these channels, changes can be made to the following parameters:

- **Input:** *Off, Line, Tone, AES/EBU, and Embedded*
- **Sample Rate:** (*Display Only*)
- **Level (L):** *Adjusts left-side input level from -6 dB to +6 dB; (default 0.0 dB)*
- **Level (R):** *Adjusts right-side input level from -6 dB to +6 dB; (default 0.0 dB)*

The digital audio gain adjustment allows for  $\pm 6$  dB of gain, and can be used to compensate for variance in line levels.

If AES is selected, the unit accepts de-embedded SDI audio on Audio 1 (*and Audio 3 in a four audio unit*) and sends it to the MPEG encoder. If only two audio channels are configured, they will be the first channel in Group 1.



Under the **Video** sub-menu, the user can change any one of three Digital video selections. They are:

- **Standard (format):** *NTSC, PAL*
- **Profile (video encoding):** *4:2:2, 4:2:0*
- **Aspect (Ratio):** *4:3, 16:9*



The **Table** sub-menu addresses how MPEG-2 data packets are identified during transmission. The following values can be set by the user:

- **Service Name:** *(16 characters)*
- **Service Provider:** *(16 characters)*
- **PCR PID:** *(hexadecimal value)*
- **Video PID:** *(hexadecimal value)*
- **Audio 1 PID:** *(hexadecimal value)*
- **Audio 2 PID:** *(hexadecimal value)*

(Refer to Section 5.1.1: **Changing Characters.**)



With the **GOP** sub-menu, the user can set the type of frames, the amount frames, and the sequence used. The options for this sub-menu are:

- **0: Low Delay** – very fast encoding with low latency (*the time it takes a data packet to move across a network connection*).

- **1: IP-15** – encoding utilizing Intra and Prediction frames, with a sequence of 15 frames.
- **2: IP-45** – encoding utilizing Intra and Prediction frames, with a sequence of 45 frames.
- **3: IPB-15** – (*default*) encoding utilizing Intra, Prediction, and Bi-directional frames, with a sequence of 15 frames.
- **4: IPB-45** – encoding utilizing Intra, Prediction, and Bi-directional frames, with a sequence of 45 frames.
- **5: IPBB-15** – the slowest encoding utilizing Intra, Prediction, and Bi-directional frames, with a sequence of 15 frames, but with double bi-directional frames. It has the highest type of encoding quality.



### System Menu Selections

The System Menu establishes the general operating parameters for the ChannelMaster TX1. The System Menu has seven sub-menus:

- **Options**
- **Remote**
- **Version**
- **Restore**
- **Frequency**
- **Factory**
- **Nextel**





With the **Option** sub-menu, the user can set the various miscellaneous parameters utilized by the system. The parameters for this sub-menu are:

- **Frequency Direct:** (*Yes, No*) - If “Yes”, the user can change the frequency from the main menu, via the Quick Knob. If “No”, the frequency can only be changed via the frequency menu.
- **Start in Standby:** (*Yes, No*) - tells the system to either start in the Standby mode (*Yes*), or begin transmitting immediately when powered-up (*No*).
- **Preset Change:** (*Yes, No*) - either enables (*Yes*) or disables (*No*) the use of Presets.
- **Nextel Menu:** (*Yes, No*) - The system will display (*Yes*) or hide (*No*) the Nextel options menu.
- **Preset Lock RF CH:** (*Yes, No*) - If “Yes”, the channel may not be changed by a preset.
- **Video Present:** (*Stdby, Bars*) - should the video signal be lost, this parameter allows the user to choose between the TX1 going into Standby Mode or displaying Color Bars.



With the **Remote** sub-menu, the user can set the various parameters utilized by the system for distance remote control communications. The parameters for this sub-menu are:

- **Mode:** (*Remote/Local, Local*) - allows the unit to be toggled

between *Remote & Local* control, and *Local (only)* control.

- **Interface:** (*RS232, RS485*) - selects between the two types of serial interface communication.
- **Address:** (*hexadecimal value*) - sets the remote address of the ChannelMaster TX1.
- **Baud Rate:** (*2400, 9600, 19200*) - sets the speed of the serial connection.



With the **Version** sub-menu, the user can access version information about the system. The options for this sub-menu are:

- **Serial Number**
- **Model Number**
- **Front Panel Revision**
- **Configuration Data**
- **Frequency Plan Number**



The **Restore** option allows the user to restore all factory defaults to the TX1 at any given time. ***Caution, all previously stored changes will be erased from memory.***



The **Frequency** option allows an experienced user to modify the frequency plan utilized by the ChannelMaster TX1. ***Extreme caution should be used, since making any errors in the programming will effect the functioning of the unit.***



The **Factory Settings** are to be used by Nucomm authorized personnel **only!** Any unauthorized tampering could make the unit unusable.



For the **Nextel** sub-menu, see Section 5.7: **Nextel BAS Relocation Settings**.

### Monitor Menu Selections



The **Monitor** option allows the user to monitor operational conditions of several components while the unit is in use.

These include:

- **PSU**
- **Temperature**
- **Modulator**
- **Upconverter**
- **RF Head**

**NOTE:** For PSU values, all voltages are set to alarm at a condition of  $\pm 10\%$ .

### Alarms

Alarms are reported when errors occur during the operation of the ChannelMaster TX1. The alarm may be the result of a detected broken communications link or an improper input (*etc.*), and not the fault of the unit

itself. Regardless of the problem, the Alarm LED will illuminate, and the LCD will flash a text message stating the alarm problem.

### Alarm History List



Working in conjunction with the **Alarms** function, the **Alarm** History List allows the user to view any active alarm(s) currently affecting the system. If the alarm problem is resolved, the alarm will disappear from the listing.



## 5.7 Nextel BAS Relocation Settings

For our US clients, the *ChannelMaster* is designed so that, when properly configured per the following guidelines, **you will only need to change one setting on one screen** when it's time to switch over to the "post-Nextel" 2 GHz band plan.

To preset the unit to allow a "one setting" switchover, there are two groups of settings that must be made in advance: "AUDIO SUB-CARRIER FREQUENCY" and "CHANNEL BANDWIDTH & BAND PLAN". These are described below.

### 5.7.1 Audio Sub-Carrier Frequency

In this section, you set your "pre-Nextel" and "post-Nextel" Audio Sub-Carrier (ASC) frequencies, so that when you make the switchover they will be ready to go.

Start the ASC set-up procedure by making the following menu selections:

**MENU>MODULATION>PARAMETER SETUP>FM>AUDIO**

This brings up a screen similar to the one at right, with the settings and selections as described below:

← <b>SC1 Insertion:</b>	(-20 to -40dBc)
<b>2(17)/7/13:</b>	4.83 MHz
<b>2(12) 1-7:</b>	4.83 MHz
<b>2(12) 8-10:</b>	4.83 MHz

*All ASC's are modified in the same fashion. ASC#1 is used as the example.*

**2(17)/7/13** This setting controls the frequency for the selected Sub-Carrier when operating in the "pre-Nextel" 2 GHz band (*USA*), as well as for all the other frequency bands (*i.e. 7 GHz or 13 GHz*). The possible range for this setting is 4.83 MHz to 8.5 MHz. (Refer to Section 5.2.1 - **Changing Operating Frequency.**)

**2(12) 1-7** This setting controls the frequency for the selected Sub-Carrier when operating in the "post-Nextel" 2 GHz band (*USA*) on channels 1 through 7. The possible range for this setting is 4.83 MHz to 5.8 MHz. (Refer to Section 5.2.1 - **Changing Operating Frequency.**)

**2(12) 8-10** This setting controls the frequency for the selected Sub-Carrier when operating in the "post-Nextel" 2 GHz band (*USA*) on channels 8 through 10. The possible range for this setting is 4.83 MHz to 8.5 MHz. (Refer to Section 5.2.1 - **Changing Operating Frequency.**)

Nucomm's Default Audio Sub-carrier Frequencies				
<i>Band-plan</i>	<i>ASC1</i>	<i>ASC2</i>	<i>ASC3*</i>	<i>ASC4*</i>
<b>2(17)/7/13</b>	4.83 MHz	6.20 MHz	6.80 MHz	7.50 MHz
<b>2(12) 1-7</b>	4.83 MHz	<b>5.80 MHz</b>	6.80 MHz	7.50 MHz
<b>2(12) 8-10</b>	4.83 MHz	6.20 MHz	6.80 MHz	7.50 MHz

**\*NOTE:** Due to bandwidth limitations, only two ASC's can be active on the "post-Nextel" 2 GHz band-plan (US), regardless of how the unit is hardware configured.

### 5.7.2 Channel Bandwidth and Band Plan

In this section, you can set your “pre-Nextel” and “post-Nextel” Video Bandwidth Deviation, so that when you make the switchover they will be ready to go.

Start this set-up procedure by making the following menu selections: MENU>SYSTEM>Nextel. Note: If the Nextel screen is not visible then it must be enabled by selecting **MENU>SYSTEM>OPTIONS>NEXTEL MENU=YES**

This brings up the screen at right, with the settings and selections as described below:

<b>2GHz Freq Plan:</b> 2G(17), 2G(12) <b>BW(2G(17)/7/13):</b> 4MHz, 3MHz <b>BW(2G(12)8-10):</b> 4MHz, 3MHz
--

#### **2GHz Freq Plan**

This setting controls the 2 GHz Frequency Plan, which will be used by the radio. Select the 17 MHz “pre-Nextel” band-plan by choosing “2G(17)”, or the 12 MHz “post-Nextel” band-plan by choosing “2G(12)”.

#### **BW(2G(17)(7/13)**

This setting controls your Video Deviation bandwidth when operating in the “pre-Nextel” 2 GHz band (USA), as well as for all the other frequency bands (*i.e.* 7 GHz or 13 GHz). The possible selections are 3 MHz or 4 MHz.

#### **BW(2G(12) 8-10)**

This setting controls the Video Deviation bandwidth when operating in the “post-Nextel” 2 GHz band (USA) on channels 8 through 10. The possible selections are 3 MHz or 4 MHz.

**NOTE:** Due to bandwidth limitations of the “post-Nextel” 2 GHz band-plan, in “2G(12)” mode, the Video Deviation bandwidth of 2 GHz channels 1 through 7 is locked at 3 MHz.

### 5.7.3 Switchover to “Post-Nextel” Settings

For our US clients, when your DMA switchover date arrives, assuming you have already set the unit per the preceding guidelines, you will only need to take the following steps to put the radio on the new “post-Nextel” settings:

**Step #1:** Navigate to the following menu: **MENU>SYSTEM>NEXTEL**

**Step #2:** Change your “2 GHz Freq Plan” setting from “2G(17)” to “2G(12)”

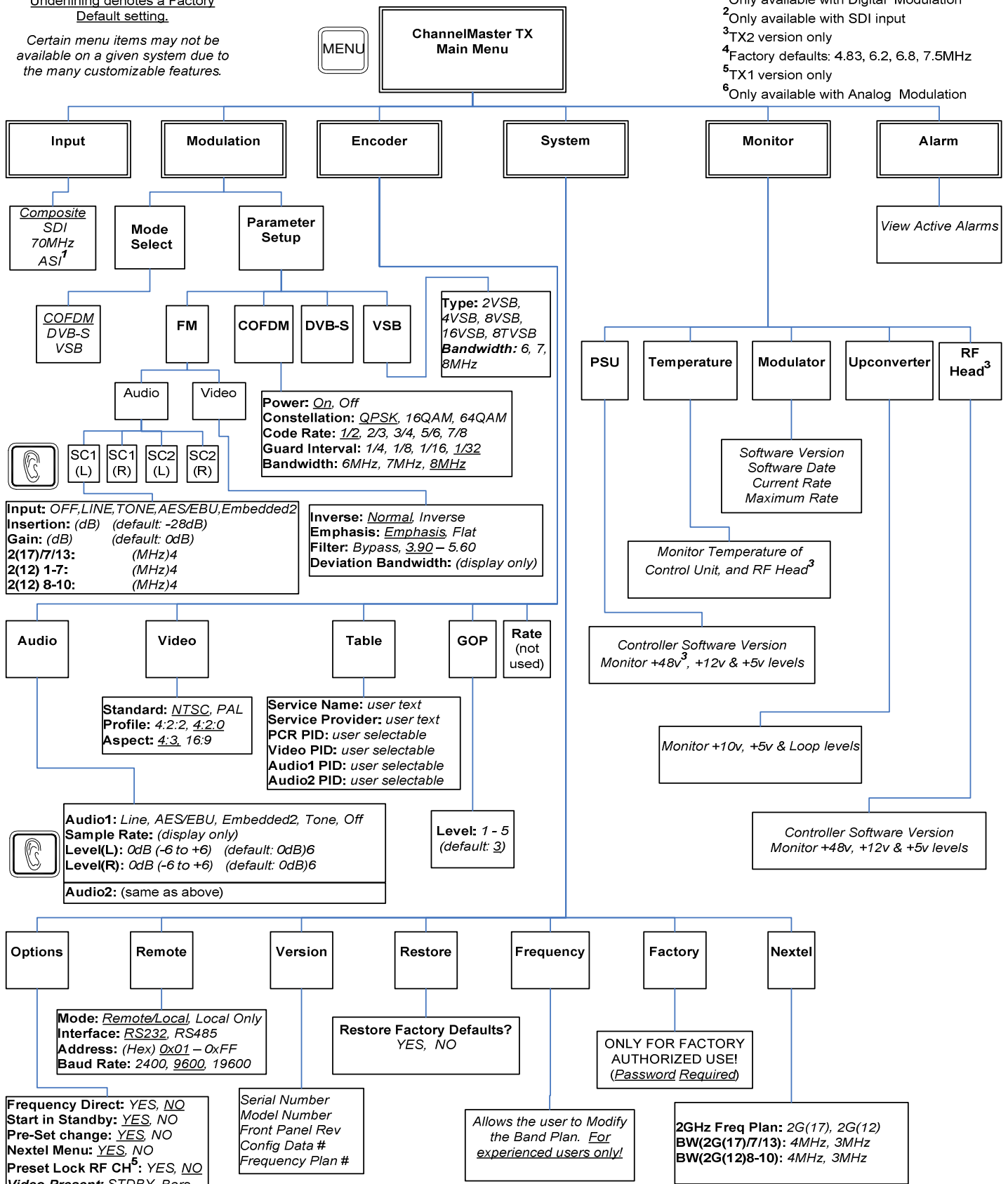
**Step #3:** Done!

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Underlining denotes a Factory Default setting.

Certain menu items may not be available on a given system due to the many customizable features.

- <sup>1</sup> Only available with Digital Modulation
- <sup>2</sup> Only available with SDI input
- <sup>3</sup> TX2 version only
- <sup>4</sup> Factory defaults: 4.83, 6.2, 6.8, 7.5MHz
- <sup>5</sup> TX1 version only
- <sup>6</sup> Only available with Analog Modulation



**Figure 5-2 ChannelMaster Menu Tree**