MICROWAVE RADIO
COMMUNICATIONS

STRATA *TX System*

Analog + Digital Portable
3.4 to 13.25 GHz Microwave
Transmitter

Operator's Guide

Manual Part No. 400504-1
Rev. C February 2007

Note To User - RF Exposure

MPE Calculation

RF Exposure

Microwave Radio Communications (MRC) provides this warning for safety purposes with the intent to inform the user of the potential hazard to RF exposure. The following guidelines for safe operation were derived from OET bulletin 65, August 1997, as recommended by the Federal Communications Commission (FCC).

The 6.4 - 7.125 GHz STRATA transmitter is a mobile transmitter designed to provide services to broadcast ENG users under CFR 74 subpart F and 74.601 TV pickup stations. This unit, operated without an antenna, will not create RF energy exceeding 1.0 mW/cm^2, the FCC limit for exposure. Once connected to an antenna, the potential for harmful exposure will be greatly enhanced.

In this situation, a certain distance from the radiator is to be maintained. Calculations need to be performed to understand what that safe margin for exposure is. This is known as the Maximum Permissible Exposure (MPE) limit.

Calculations provided are for common antennas often utilized in the ENG environment. The following formula used is that suggested by OET 65.

Calculating MPE

$$S= \frac{PG \text{ (or EIRP)}}{4\pi R^2}$$

$$EIRP = P * (10 \wedge (G / 10)) = (\text{antilog of } G/10) * P$$

P = RF power delivered to the antenna in mW
G = Power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna in centimeters
S = MPE in mW/cm² (milliwatts per square centimeters)

Conversions
dBi to numeric gain = Antilog (dBi/10)
Feet to centimeters = Feet * 30.48
Centimeters to Feet = cm * .0328
4 π = 12.57

User Input
RF power delivered to the antenna = Watts
Antenna gain (referenced to isotropic antenna) = dBi
Distance from the center of radiation = Feet

Calculation steps:

1. [P] RF power input. Convert watts to milliwatts = Watts * 1000
2. [G] Antenna gain dBi. Convert to numeric gain = Antilog (dBi/10)
3. [EIRP] Multiply P * G
4. [R] Convert centimeters to feet = Centimeters * .0328
5. Square R

6. Multiply R² * 4π
7. [S] Divide (R² * 4π) into EIRP

S = Power Density in milliwatts per square centimeters. Note: At frequencies above 1500 MHz, S must not be greater than 1

Reference
FCC OET Bulletin 65, August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

Figure 1 and Figure 2 show the maximum exposure distance for various antennas. One plot provides the maximum permissible output of the STRATA transmitter for analog modulation, and the other plot for digital modulation.

MRC, in accordance with the requirements set forth by the FCC, provides this information as a guide to the user. It is assumed that the users of this equipment are licensed and qualified to operate the equipment per the guidelines and recommendations contained within the product user guides and in accordance with any FCC rules that may apply.
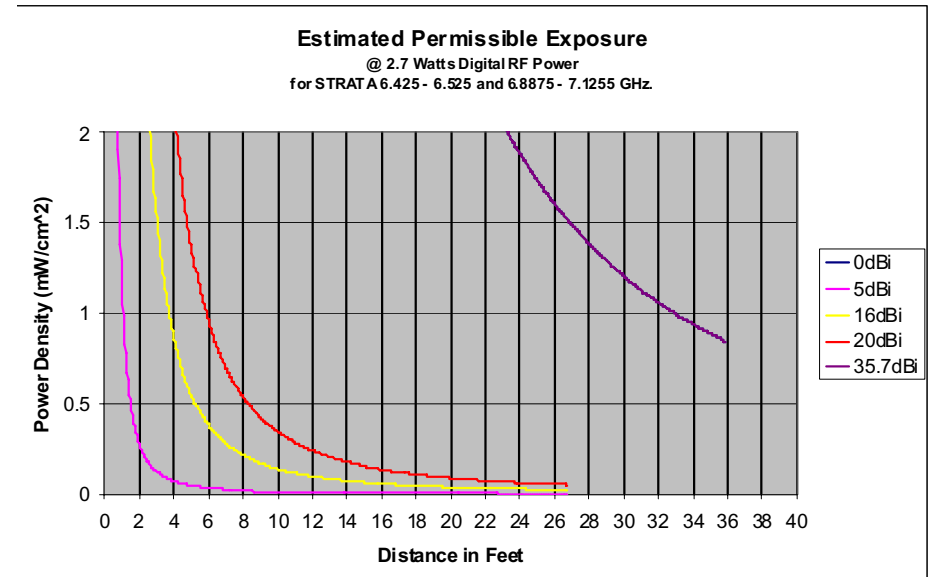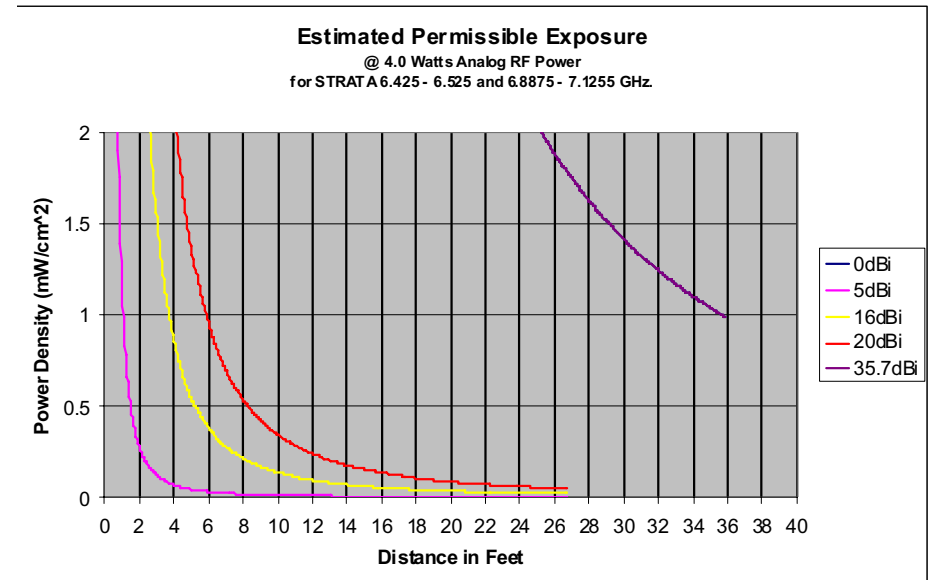
Figure 1: Analog Modulation

Estimated Permissible Exposure
@ 2.7 Watts Digital RF Power
for STRATA 6.425 - 6.525 and 6.8875 - 7.1255 GHz.

Figure 2: Digital Modulation

Estimated Permissible Exposure
@ 4.0 Watts Analog RF Power
for STRATA 6.425 - 6.525 and 6.8875 - 7.1255 GHz.

The following table reflects the graphic representations above.

Table 1:

Antenna Gain (dBi)	Minimum Distance from Antenna (cm)	Minimum Distance from Antenna (inch)
0	20	7.87
5	35	13.7
16	112	44
20	560	220.4
37.5	1088	428.3

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Notices

About This Manual

Part number **400504-1**

Revision **C February 2007**

The information in the manual applies to the Microwave Radio Communications (MRC) STRATA TX System.

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Quality Certification

Microwave Radio Communications is certified to ISO 9001:2000.

Regulatory Status

This product is certified to conform to CENELEC standards EN 55020, EN 55013, EN 50082-1, and EN 60950 and carries the CE mark.

Authorized EU representative: Vislink PLC.

Conventions

Pay special attention to information marked in one of the following ways:

WARNING	Follow WARNINGS closely to prevent personal injury or death.
CAUTION	*Follow CAUTIONS to prevent damage to the equipment.*
Note	Notes provide additional information to assist you in using and maintaining the equipment.

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Text displayed as **blue** contains a hypertext link. Click on the **hypertext** to jump to that destination. Click on the **blue destination** to return.

Viewing this manual on-line requires Adobe Acrobat, version 4.0 or above.

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Symbols Used

The following symbols are used on the equipment:

Symbol	Meaning
⚠	WARNING: General Warning. Risk of Danger
⚡	WARNING: Risk of Electric Shock
	WARNING: Electrostatic Discharge. Possible Damage to Equipment
∿ - OR - ⊟	Fuse - Identifies fuses or their location.
⏚	Frame or Chassis Ground - Identifies the frame or chassis terminal.
⏚	Earth Ground - Identifies the earth Ground Terminal
⏚	Protective Earth Ground - Identifies any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal on a protective earth electrode.

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a. Products manufactured by MRC are warranted against defects in material and workmanship for a period of two (2) years from date of delivery as evidenced by MRC's packing slip or other transportation receipt (unless otherwise noted).

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Contents

1 *Introduction*

1.1 Chapter Overview

This chapter will introduce you to the Operator's Guide: what it covers, how it's organized, and for whom it's written.

1.2 How to Use This Manual

This manual was prepared to be viewed on a Windows-based PC. A pdf file for this manual is provided on the CD ROM delivered with each STRATA Transmitter (TX) System. The CD ROM contains pdf files for the Operator's Guide, the Technical Reference Manual, and the Quick Reference Cards. Hardcopies of the Operator's Guide, the Technical Reference Manual, and the Quick Reference Cards are also delivered with each STRATA TX System.

Viewing of this manual on-line requires Adobe Acrobat, Version 4.0 or above. Click on the following icon to download your FREE copy of Adobe Acrobat Reader.

When viewing this manual on-line, text displayed as **blue** contains a hypertext link. Click on the **blue hypertext** link to jump to that destination. If the destination link is also blue, click on the **blue destination** link to return.

1.3 What This Manual Covers

This manual describes how to operate the STRATA TX Transmitter System.

For information on Installation, Repair, Replacement Parts, and Theory of Operation, refer to the STRATA TX Technical Reference Manual.

This manual also covers various configurations of the STRATA TX System. Your STRATA TX System will consist of one of the following configurations:

- A Standalone Transmitter Control Unit (TCU)
- A Standalone Transmitter Unit (TXU)
- A TCU and TXU.

Your TX System may be mounted on a tripod or may be mounted in a vehicle or in an aircraft. Your TX System may also include an optional MRC AC to DC Converter Unit (ACU).

If your system is mounted in a vehicle or in an aircraft, it may include an optional MRC Remote Control Panel or Aircraft Remote Control Panel. This manual provides coverage for all of these various configurations.

1.4 How It's Organized

The manuals for the STRATA TX System are organized as follows:

Chapter	Operator's Guide	Technical Reference Manual
Introduction	☑	☑
Product Description	☑	☑
Routine Operation	☑	☑
Troubleshooting	☑	☑
Advanced Operation		☑
Installation		☑
Repair		☑
Replacement Parts		☑
Theory of Operation		☑
Appendix A - Channels & Frequencies	☑	☑
Appendix B - Glossary	☑	☑
Appendix C - Configurator Reference		☑
Appendix D - Specifications	☑	☑

Note   The Technical Reference Manual contains everything in the Operator's Guide, plus additional technical content.

1.5   For Whom It's Written

This manual is intended for use by personnel assigned to operate the STRATA TX System. Users of this manual should already be familiar with basic concepts of radio, video, and audio.

1.6   Related Documents

- STRATA TX System Technical Reference Manual (part no. 400505-1)

- STRATA TX System Quick Reference Card (part no. 400506-1)

- STRATA Aircraft Remote Control Panel Operator's Guide (part no. 400490)

- STRATA Remote Control Panel Operator's Guide (part no. 400489)

1.7   Ordering Documentation

Any of the above manuals may be ordered by contacting MRC Customer Service:

Business Hours: Monday - Thursday

8:00 AM - 7:00 PM Eastern Time (US)

(0800 - 1900 hrs US ET)

Friday

8:00 AM - 5:00 PM Eastern Time (US)

(0800 - 1700 hrs US ET)

Telephone: 800-490-5700 (Press 3)

978-671-5700 (Press 3)

Fax: 978-671-5800

E-mail customerservice@mrcbroadcast.com

When contacting Customer Service, please have the following information available:

- Model number and serial number of the unit. This is located on a label on the bottom of each unit.

- Approximate purchase date.

- Radio version, which appears on the TXU or TCU alphanumeric display at startup.

or

- Firmware versions displayed on the **Main** page of the STRATA TX Configuration Utility, when the STRATA TX Configuration Utility is connected to the TXU or TCU.

1.8   Calling for Service

MRC Technical Support is available 24 hours a day, 7 days a week. During regular business hours you can reach our expert staff directly.

Business Hours: Monday - Friday

8:00 AM - 7:00PM Eastern Time (US)

(0800 - 1900 hrs US ET)

Telephone: 800-490-5700 (Press 4)

978-671-5700 (Press 4)

Fax: 978-671-5800

E-mail: technicalsupport@mrcbroadcast.com

After regular business hours and on weekends and holidays, you can also reach our expert staff as follows:

Telephone: 978-671-5929

Your call will be automatically forwarded to the on-call Technical Support specialist.

When contacting Technical Support, please have the following information available:

- Model number and serial number of the unit. This is located on a label on the bottom of each unit.

- Approximate purchase date.

- Radio version, which appears on the TXU or TCU alphanumeric display at startup.

or

- Firmware versions displayed on the **Main** page of the STRATA TX Configuration Utility, when the STRATA TX Configuration Utility is connected to the TXU or TCU.

1.9   Supported Repairs

The STRATA TX System, including the TXU, TCU, and optional ACU, is designed to be compact, rugged and reliable.

The TXU and TCU require specialized test equipment to calibrate amplitude and frequency characteristics after repair. In addition, sealing the TXU, TCU, or optional ACU enclosures after repair requires exacting techniques and special fixtures to ensure weather resistance of the units.

Therefore, there are NO supported field repairs to either the TXU, TCU, or ACU.

Return the entire unit for factory repair.

If you attempt field repair, you risk damaging your equipment. If your equipment is under warranty, you may also affect your warranty coverage.

1.10   Tell Us What You Think!

We'd appreciate any comments or suggestions you have about this manual. The more feedback we get, the better the manuals get!

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Feedback

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Be sure to tell us what product you're writing about, and which manual - the Operator's Guide, the Quick Reference Card, or the Technical Reference Manual.

2 *Product Description*

2.1 Chapter Overview

This chapter provides an overall description of the STRATA TX System, its components, and its capabilities.

Here are the topics covered:

2.2 System Description

The STRATA TX System is a highly reliable, flexible, and compact portable microwave transmitter system ideal for tripod, airborne, or mobile installations. A typical STRATA TX System is composed of the Transmitter Unit (TXU) and the Transmitter Control Unit (TCU), as shown in . This modular architecture allows you the maximum flexibility in configuration, siting, and operation.

The STRATA TX System key features are:

- Analog, Digital, or Analog/Digital Switchable
- MPEG Encoding (4:2:0, 4:2:2)
- COFDM Modulation with Forward Error Correction and Selectable Guard Band Interval
- Digital Modulation for QPSK, 16 QAM, and 64 QAM
- NTSC or PAL Modulation with Audio (4 mono or 2 stereo)
- Tripod, Half Rack, or Full Rack Mounts
- Front Panel Local Control
- Remote Control
- Bands from 3.4 to 13.25 GHz

Figure 2-1: STRATA TX System Block Diagram
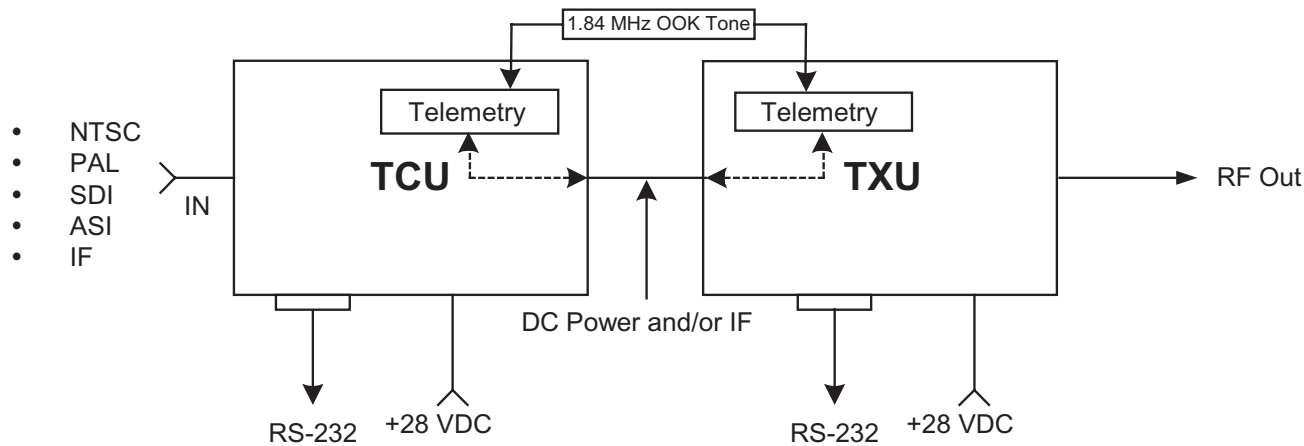
The STRATA TX System TXU and the TCU may be operated in stand-alone configurations depending upon specific video applications.

2.2.1   System Options

The STRATA TX System can be ordered configured for 1 of 11 specific RF bands as follows:

- 3.4 to 3.9 GHz
- 4.4 to 5.0 GHz
- 6.4 to 7.1 GHz
- 6.9 to 7.5 GHz
- 7.4 to 8.1 GHz
- 7.8 to 8.5 GHz
- 8.2 to 8.9 GHz

- 10.0 to 10.7 GHz
- 10.5 to 11.2 GHz
- 10.8 to 11.5 GHz
- 12.7 to 13.25 GHz

MRC is constantly working to expand and upgrade the capabilities of the STRATA TX System. Consult your Sales Representative or contact the factory for the latest band availability.

The STRATA TX System (typically) consists of the following components:

TXU   The Transmitter Unit (TXU) can be equipped with either an FM Modulator or COFDM/MPEG module, but not both. A High Power Unit (HPU) is also contained within the TXU housing to increase RF power output.

TCU The Transmitter Control Unit (TCU) can be equipped with either an FM Modulator or COFDM/MPEG module, or both.

ACU The optional AC to DC Power Converter (ACU) provides +28 VDC power from an AC power source to power one or more units in a system.

Remote Control Panels Optional Remote Control Panels are available to allow remote control of the STRATA TX System from an instrument panel during airborne or mobile operations.

2.2.2   Single Unit Systems

The TXU or TCU may be used independently in single-unit applications as follows:

- The TXU may be used as a stand-alone transmitter accepting an IF input.

- The TXU may be used as a stand-alone transmitter featuring FMT modulation or MPEG and COFDM.

- The TCU may be used as a stand-alone unit used for FMT modulation or MPEG and COFDM, or both FMT modulation and MPEG and COFDM.

2.2.3   Multi-Unit Systems

The TXU and TCU can be configured as part of an integrated system as follows:

- The TCU may contain the FMT modulator and MPEG/COFDM module supplying an IF signal to a TXU containing only the RF transmitter.

- The TXU may contain the RF modulator or MPEG/COFDM module supplying an RF signal directly to the transmitter antenna.

- The TCU can be separated from the TXU in applications where the transmitter needs to be placed in another location.

2.2.4   Remote Control Options

For portable mobile or airborne operations, the STRATA TX System may be controlled by one of two models of Remote Control Panels. The Remote Control Panels are mounted in mobile racks or aircraft instrument panels and are connected via an RS-232 cable between the Remote Control Panel and the STRATA TX System.

2.2.5   Antenna and Power Options

The flexible architecture of the STRATA TX System allows a number of options for both the transmit antenna and the power.

Antenna Options The STRATA TX System is fully compatible with the MRC family of transmit antennas, including:

- OmniPole omnidirectional

- Megahorn compact horn

- SectorScan flat panel

- MicroScan parabolic

- Ellipse parabolic

Contact your Sales Representative to explore the wide array of antenna choices available.

CAUTION   *To prevent damage to your STRATA TX System, MRC recommends using a +28 VDC power supply. Do not exceed +36 VDC input power or damage will occur.*

Power Options The STRATA TX System configurations operate on +28 VDC power, supplied externally. This DC power can be supplied by the optional STRATA ACU, or from another DC power source. Contact your Sales Representative for the latest details.

Note   A TCU and TXU are defined as being "co-located" when the TXU and TCU are physically separated by not greater than 6 feet.

If the TXU and TCU are co-located, power must be supplied to each unit through their individual power connectors from the same power source. See Figure 2-2. Do not use DC on coax to power the TXU or TCU when the units are co-located.

Figure 2-2: Powering the TXU and TCU Independently
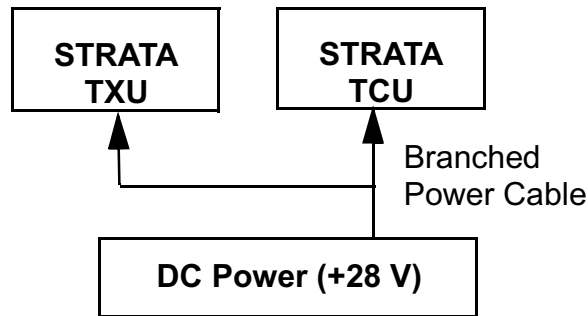
If your installation calls for separating the TXU and TCU, the TXU is powered by DC supplied by the TCU or the TCU is powered by DC supplied by the TXU. The DC power is superimposed on the coaxial cable connected between the units. See Figure 2-3 and Figure 2-4.

The DC input voltage to the unit co-located with the DC power supply must be greater than +24 VDC.

Refer to the "Installation" Chapter on page 6-1 (part of the STRATA TX Technical Reference Manual only) for additional information.

For those applications that use a TCU in a standalone mode, i.e., to generate ASI or DVB-S signals, DC power from the TCU to the TXU or from the TXU to the TCU cannot be used.

Figure 2-3: Powering the TXU from the TCU
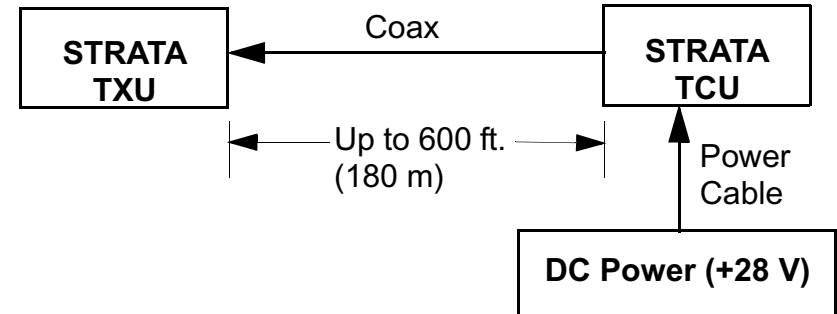
Figure 2-4: Powering the TCU from the TXU
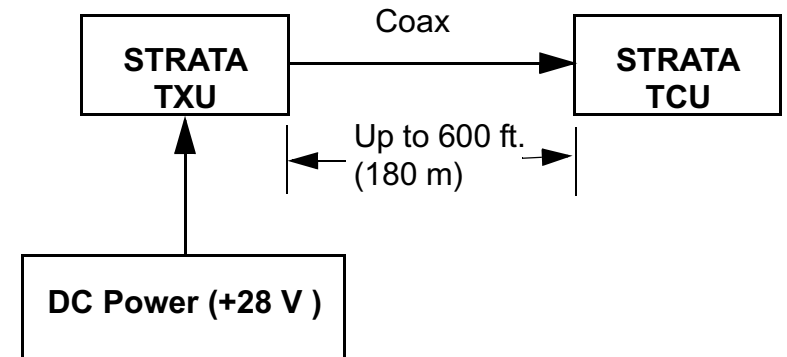
DC power superimposed on the coaxial cable between a TCU and a TXU can be supplied from either the TCU or TXU, depending upon the location of the DC power supply. Coaxial cable length/voltage limitations exist when powering from either the TXU or TCU. These limitations are based on cable size, DC voltage input, cable resistance, and cable length. A maximum length of 600 feet (180 meters) between the TXU and TCU is supported. Contact MRC Technical Support for more information on cable requirements.

DC power required for a STRATA TX System depends upon the TX System configuration, i.e., if the TXU or TCU are operated in a standalone mode, if the TXU and TCU are co-located, or if the TXU and TCU are mounted in separate locations. See Figure 2-5 on page 2-6 for the various STRATA TX System configurations available.

For TX Systems that use DC power sources other than a STRATA ACU, contact MRC Technical Support for additional power information.

2.2.6   Mounting and Deployment Options

The STRATA TX offers a number of options for either mobile or portable applications.

For more details on installation of the STRATA TX in various applications, see the "Installation" Chapter on page 6-1 (part of the STRATA TX Technical Reference Manual only).

Mobile Installation For mobile applications such as in a vehicle or in an aircraft, the STRATA TX System is usually mounted in an MRC fixed mounting bracket and is installed in a bulkhead or compartment. The cabling is permanently installed and power comes from aircraft or vehicle power.

Portable Deployment In portable applications, the STRATA TX System will be moved from place to place and set up each time.

The TXU and TCU will usually be mounted in a MRC universal mounting bracket. The bracket is attached to a tripod using a mounting plate and quick release.

The cabling between the TXU and TCU is typically left in place and the power, antenna, and audio/video connections are removed at the end of each deployment.

2.2.7   System Integration

System Communication When the TXU and TCU are connected, they automatically communicate via signals superimposed on the coaxial cable between the two units. This allows them to share information on installed hardware, preset configurations, current status, and alarms.

System Operation Once the TXU and TCU are connected and communicating, the units work seamlessly together. System settings can be selected and modified from the front panel of either unit, regardless of which unit holds the hardware being configured.

System Configuration The STRATA TX System offers two levels of system configuration, designed to match the needs of different personnel.

For the field operator, the STRATA TX System has up to 9 Presets that can be selected from the front panel. Each Preset controls key parameters such as modulation, frequency, and audio and video settings. Additional settings that are front panel-controlled include band, channel, offset, and filtering.

For the advanced operator and technical staff, the STRATA TX Configurator software allows complete control of all parameters in the STRATA TX System. The STRATA TX Configurator software runs on a Windows-based PC and connects to either the TXU or the TCU via an RS-232 serial interface cable.

Interfacing a PC to either the TXU or TCU in a connected system gives you complete control of both units. You can read the current settings, program new settings, or return the units to their factory default settings. The STRATA TX Configurator software automatically detects what hardware is installed in the system and assigns the appropriate configuration to the correct hardware, regardless of which unit holds the hardware being configured.

Figure 2-5: STRATA TX System Options
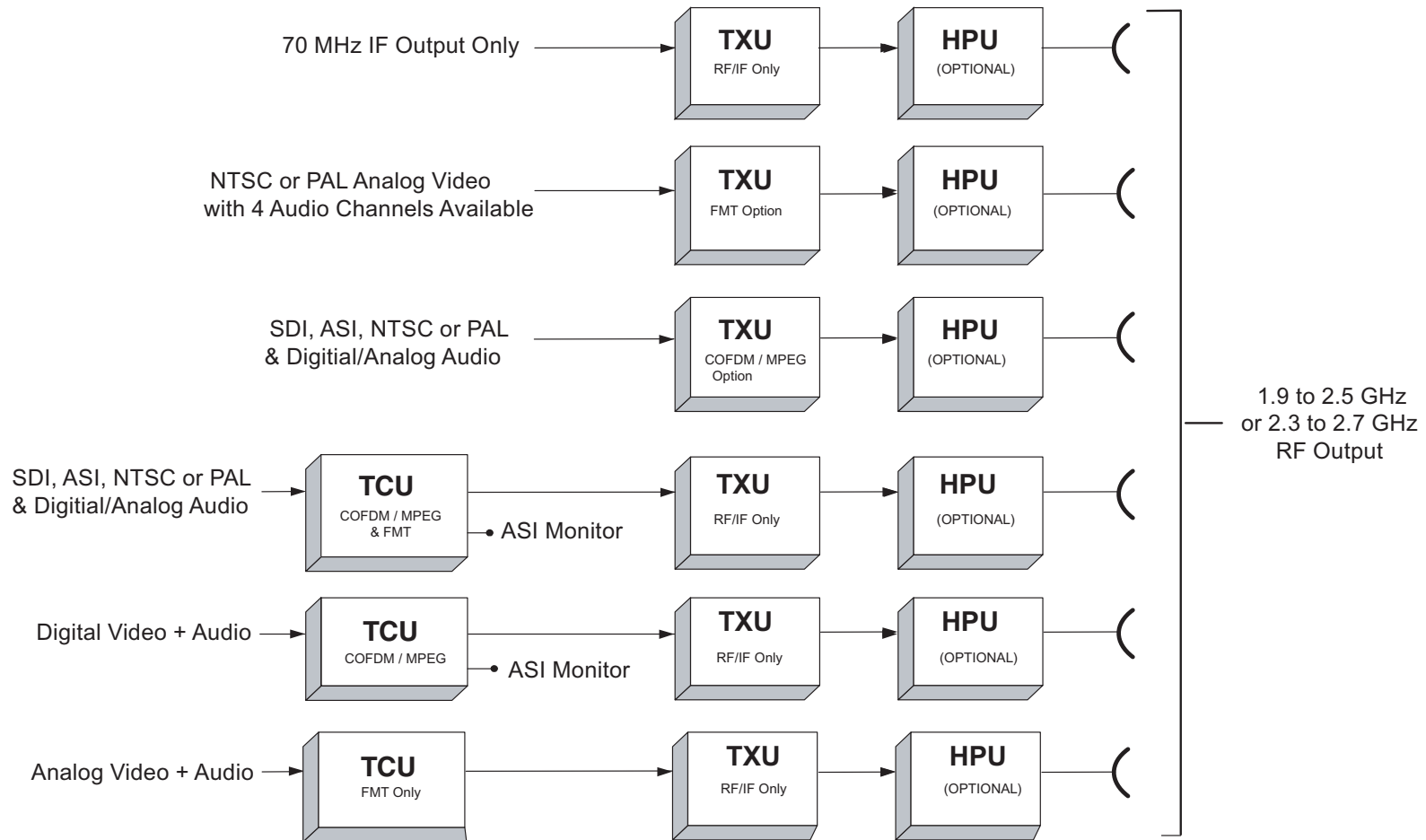
2.3 System Components

This section will provide more details about each the components of a STRATA TX System:

- STRATA TXU
- STRATA TCU
- STRATA ACU
- STRATA Remote Control Panels

For details on connections between the STRATA TX System components, refer to the "Installation" chapter (part of the STRATA TX Technical Reference Manual only).

2.3.1 STRATA TXU

The TXU (See Figure 2-6) always contains an IF/RF module that accepts either a 70 MHz COFDM, FMT IF, or external 70 MHz input signal and up-converts these signals to the required RF band. The RF frequency synthesizer circuit included in the IF/RF unit, in conjunction with the command and control power supply module, provides the means to channelize RF video and audio signals in the TX System RF band.

The TXU, with either an analog (FMT) or digital (MPEG/COFDM) module, is integrated in the same housing as the HPU components. This provides the ability to incorporate high RF power output (12 watts of saturated RF power) into a single analog or digital transmitter assembly.

Standard U.S. FCC band plans, as well as customer-created channel plans, may be customized using the STRATA TX Configurator software.

Figure 2-6: STRATA TXU
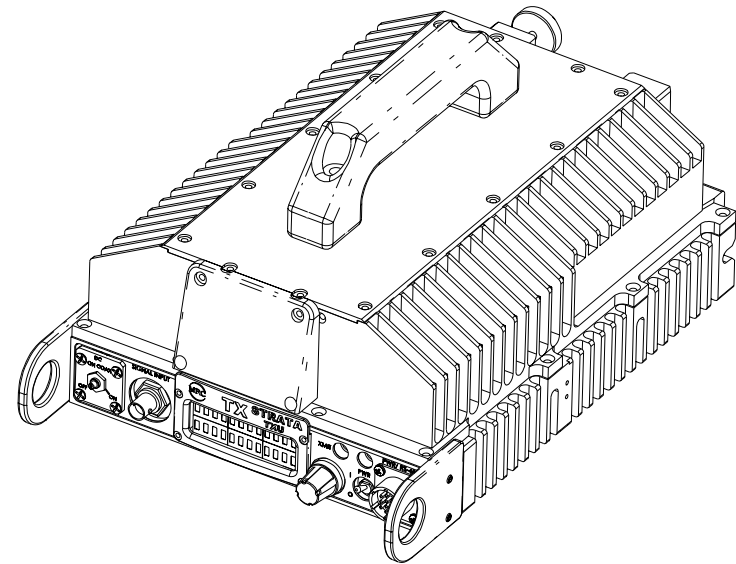
As noted previously, the TXU may also include either an MPEG/CODFM or FMT module (but not both), in which case the TXU serves as a stand-alone digital or analog video microwave transmission system.

2.3.2 STRATA TCU

The TCU (See Figure 2-7 on page 2-8) may contain either analog or digital or both analog and digital video modulation modules.   Where an application might initially employ only analog video transmission but expects to migrate to dual, switchable, analog and digital operation, the TCU may be upgraded to add the MPEG/COFDM module to add this capability.

Figure 2-7: STRATA TCU
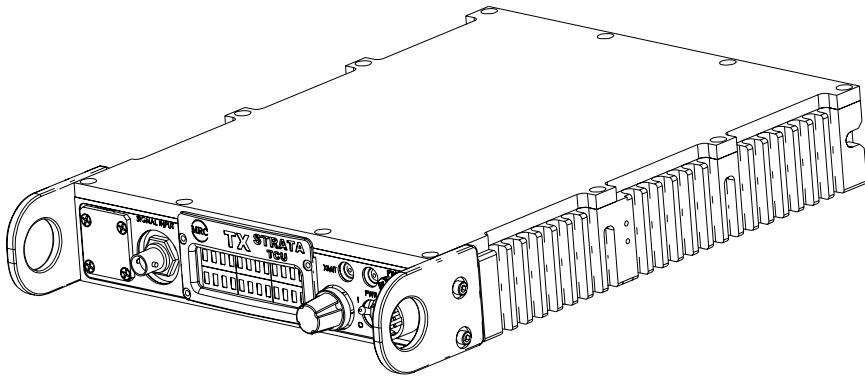
Where only digital or analog video transmission is desired, the MPEG/COFDM or FMT modules may be installed in a TXU, thereby eliminating the need for a TCU. The STRATA TX design does not permit splitting digital and analog video modulator modules between a TXU and a TCU.

A TCU may also consist of a stand-alone configuration whereby either or both MPEG/COFDM and FMT modules may be used independent of the TXU. This configuration permits use of a TCU equipped with analog and/or digital video modulation modules for a variety of signal input and output configurations, including a digital option using NTSC or PAL composite video input and ASI (digital) signal output.

2.3.3   STRATA ACU

For fixed or portable deployment applications, the STRATA TX System may be powered by the optional AC to DC Converter (ACU). See Figure 2-8.

Figure 2-8: AC to DC Converter
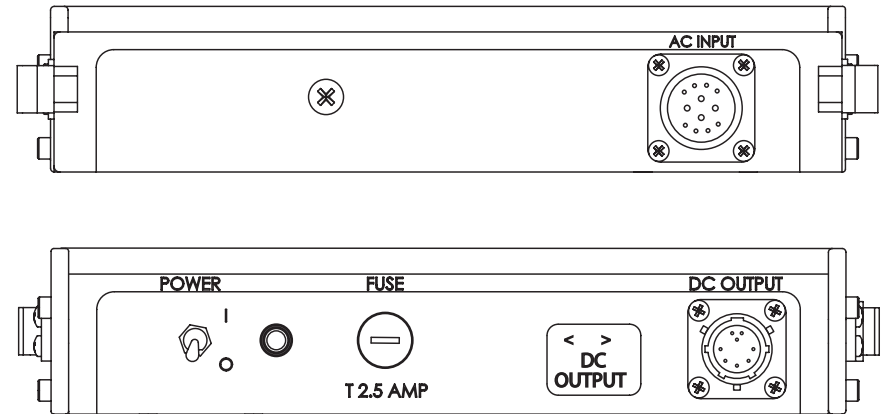
The ACU installs as part of an integrated stack for either tripod or fixed applications. The ACU may also be used to power the TXU or TCU only when a TXU and TCU are not co-located. In this case, the TXU would receive DC power from the TCU or the TCU would receive DC power from the TXU superimposed on the coaxial cable connected between the units.

In standalone TXU or TCU operations, the optional ACU may be used to supply DC power directly to the applicable unit. In the case where a TXU and a TCU are co-located, it is recommended that both the TXU and TCU be powered directly from the ACU in lieu of supplying DC power from the TCU to the TXU or from the TXU to the TCU via the coaxial cable connected between the units.

2.3.4   STRATA Remote Control Panels

For mobile or airborne operations, two Remote Control Panel models are currently available. Contact your Sales Representative for the latest information.

Both Remote Control Panel models provide simplified transmit operations by allowing the operator or pilot to select either analog or digital pre-configured Presets, Channels, and Offsets, depending upon the required operating mode.

Standard Remote Control Panel The standard STRATA Remote Control Panel (See Figure 2-9) provides instrument panel remote control of the STRATA TX System for mobile operations and features 9 selectable Presets.

For additional information, refer to the STRATA Remote Control Panel Operator's Guide (part no. 400489).

Figure 2-9: Standard Remote Control Panel
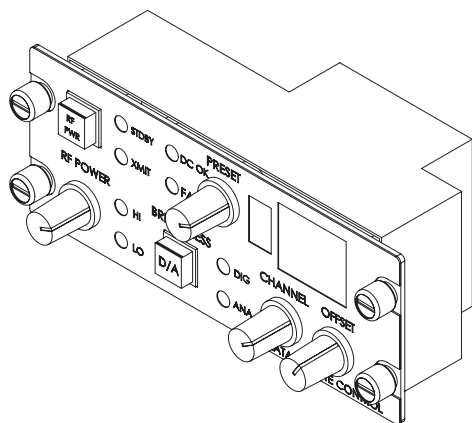
Aircraft Remote Control Panel The STRATA Aircraft Remote Control Panel (See Figure 2-10) is a simplified version of the standard STRATA Remote Control Panel. This panel provides instrument panel remote control of the STRATA TX System for airborne operations. This model features only two Presets for ease of operation.

The unit is designed to fit a standard aircraft instrument panel and provides user-friendly controls, combined with well placed and easy to read LED displays and color indicators.

For additional information, refer to the STRATA Aircraft Remote Control Panel Operator's Guide (part no. 400490).

Figure 2-10: Aircraft Remote Control Panel
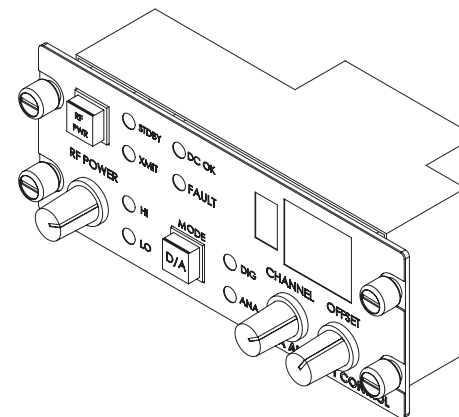
2.4   TXU and TCU Configurations

TXU Different configurations of the TXU are available, depending upon if your TX System contains a standalone TXU or if your TX System contains both a TXU and TCU. The different configurations are described below.

If your TXU is equipped with either an analog (FMT) module or a digital (MPEG/COFDM) module and was ordered to operate in a standalone mode without a TCU, the front panel will contain an **AUDIO** connector. See Figure 2-11 on page 2-10.

Figure 2-11: Standalone TXU Configuration

AUDIO Connector

SIGNAL INPUT Connector

Front View

PWR/RS-485 Connector
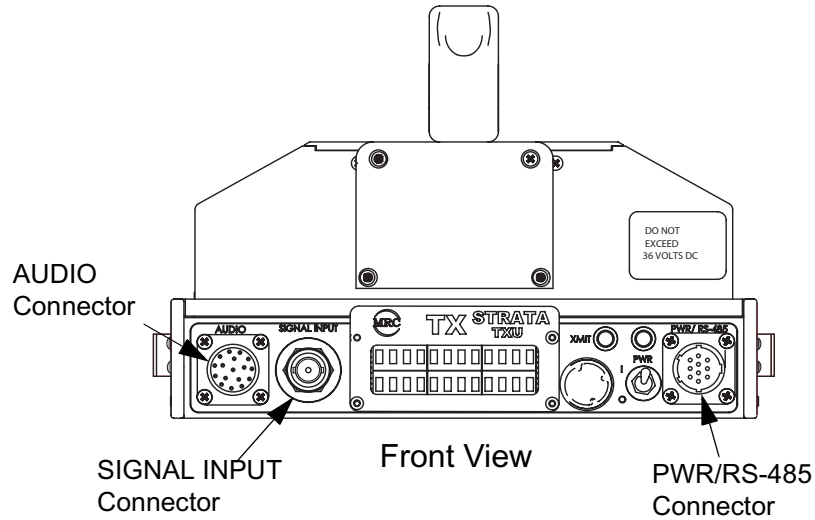
Figure 2-12: TXU - TXU with TCU Configuration

DC ON COAX Switch

SIGNAL INPUT Connector

Front View

PWR/RS-485 Connector

RF Output Connector

Rear View

RS-232 Connector
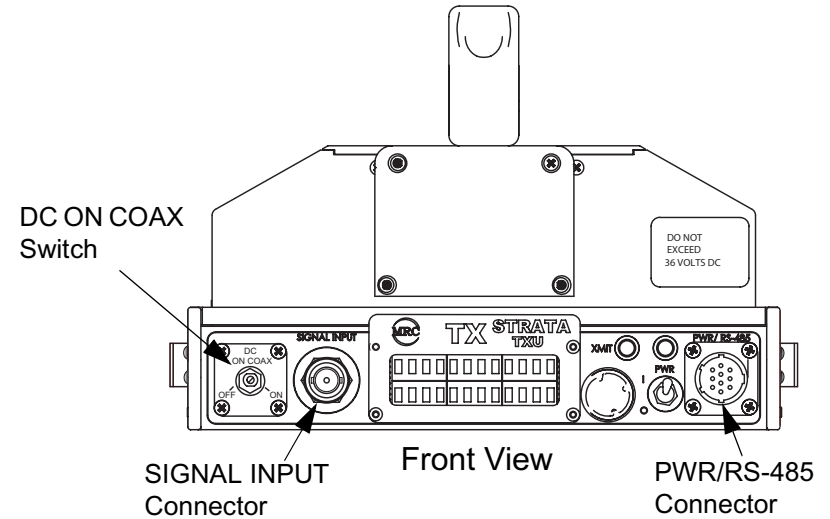
If your TXU was ordered to operate with a TCU, it will not contain either analog or digital modules and will therefore not contain an **AUDIO** connector. The **AUDIO** connector is replaced by a **DC ON COAX** switch.

The **DC ON COAX** switch allows manual control of DC power to the TXU from the TCU or from the TCU to the TXU via DC power superimposed on the coaxial cable connected between the two units.

The rear of the TXU is identical on both configurations of the TXU.
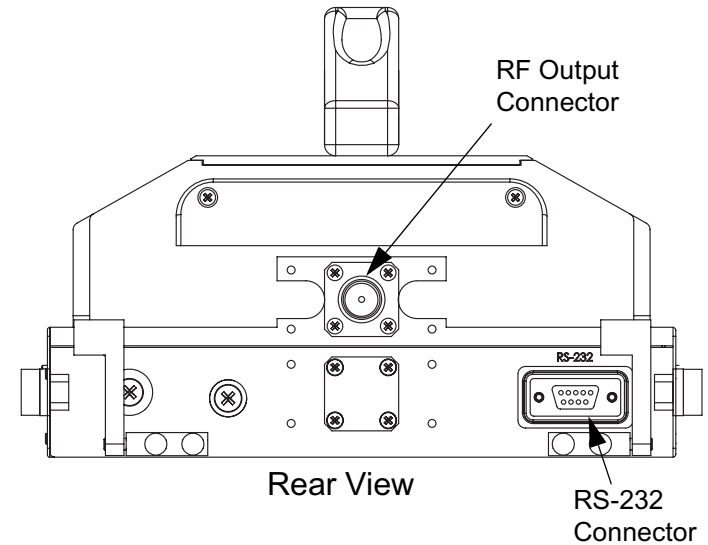
TCU Several different configurations of the TCU also exist as the result of technical updates. Configuration differences are described below.

TCU - Older Configuration If your TCU is an older configuration, the controls and connectors contained on the TCU are similar to those shown in Figure 2-13. Older configurations do not contain the front panel **DC ON COAX** override switch to provide manual control of DC power to a TXU.

Figure 2-13: TCU - Older Configuration

Front View

RS-232 Connector

POWER Connector

SIGNAL OUT Connector

Monitor (MON) Connector

AUDIO Connector

Rear View

SIGNAL IN Connector
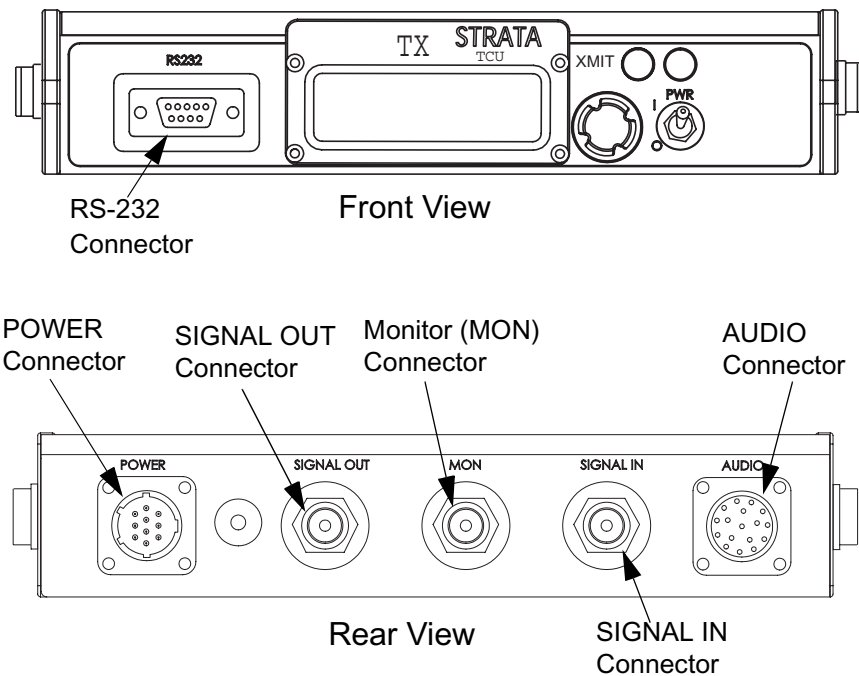
TCU - Newer Configuration If your TCU is the newer configuration, the controls and connectors contained on the TCU are similar to those shown in Figure 2-14. A **DC ON COAX** switch is located on the front panel to provide manual control of DC power to a TXU.

Figure 2-14: TCU - Newer Configuration

Front View

RS-232 Connector

DC ON COAX Switch

POWER Connector

SIGNAL OUT Connector

Monitor (MON) Connector

AUDIO Connector

Rear View

SIGNAL IN Connector

2.5 Typical System Configurations

Typical STRATA TX System configurations are shown in Figure 2-15.

Figure 2-15: STRATA TX System Configurations
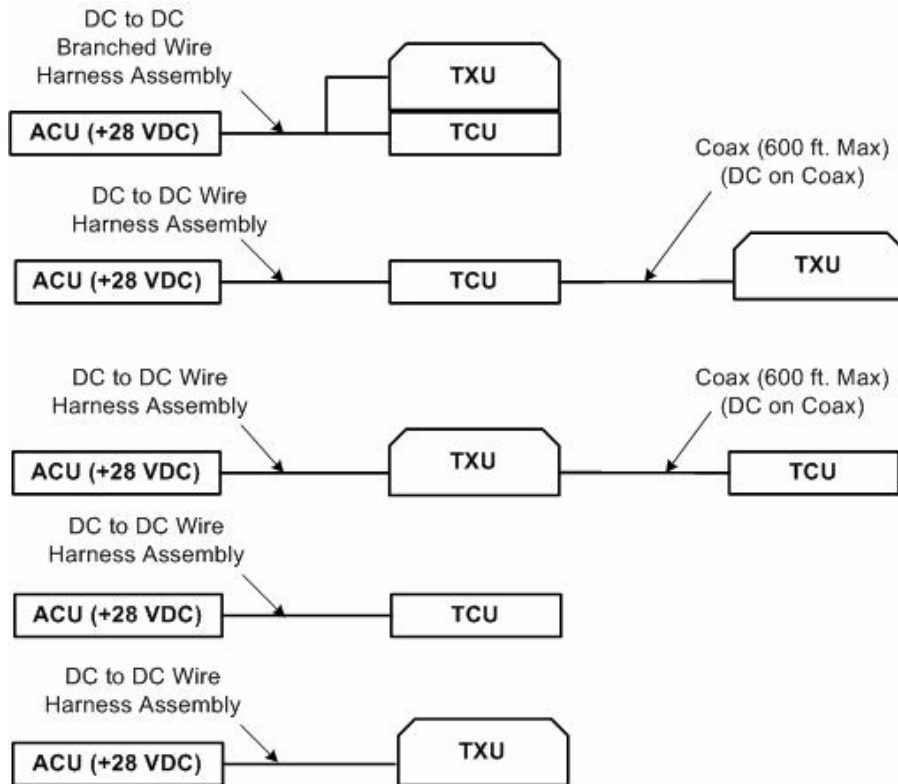
2.6 For More Information

Additional detailed technical information about the STRATA TX System is contained in the STRATA TX Technical Reference Manual. Specific topics contained in the Technical Reference Manual are listed below:

Topic	Chapter
Changing settings using the Configurator software	See Chapter 5, "Advanced Operation"
Installation	See Chapter 6, "Installation"
Connections to other equipment	See Chapter 6, "Installation"
Supported Repairs	See Chapter 7, "Repair"
Repair Parts	See Chapter 8, "Replacement Parts"
Block Diagram	See Chapter 9, "Theory of Operation"

3   *Routine Operation*

3.1   Chapter Overview

This chapter provides basic information that will enable you to operate your STRATA TX System.

Here are the topics covered:

Information on settings made with the STRATA TX Configuration Utility software can be found in the "Advanced Operation" Chapter on page 5-1 (part of the STRATA TX System Technical Reference Manual only).

For a summary of settings that can be made with the TXU and TCU front panel control switches and which settings are made using the STRATA TX Configuration Utility, see Section 3.7 on page 3-35.

3.2 Overview of Controls, Indicators, and Connectors

This section describes the controls, indicators, and connectors used on the STRATA TX System.

3.2.1 TXU Controls, Indicators, and Connectors

Controls, indicators, and connectors contained on the TXU are identified and described below. Topics covered are as follows:

Topic	Page
TXU Front Panel DC ON COAX Switch	3-2
TXU SIGNAL INPUT Connector	3-3
TXU AUDIO Connector	3-3
TXU Alphanumeric Display	3-3
TXU XMIT LED	3-3
TXU Status LED	3-4
TXU PWR/RS-485 Connector	3-4
TXU PWR Switch	3-4
TXU Control Switch	3-4
TXU RF Output Connector	3-5
TXU RS-232 Connector	3-5

Each of these controls, indicators, and connectors are described in more detail in the following paragraphs.

Controls, indicators, and connectors contained on the TXU front panel are shown in Figure 3-1. Connectors contained on the TXU rear panel are shown in Figure 3-2 on page 3-3. For configuration differences in the TXU, see "TXU and TCU Configurations" on page 2-9.

Figure 3-1: TXU Controls, Indicators, and Connectors - Front View
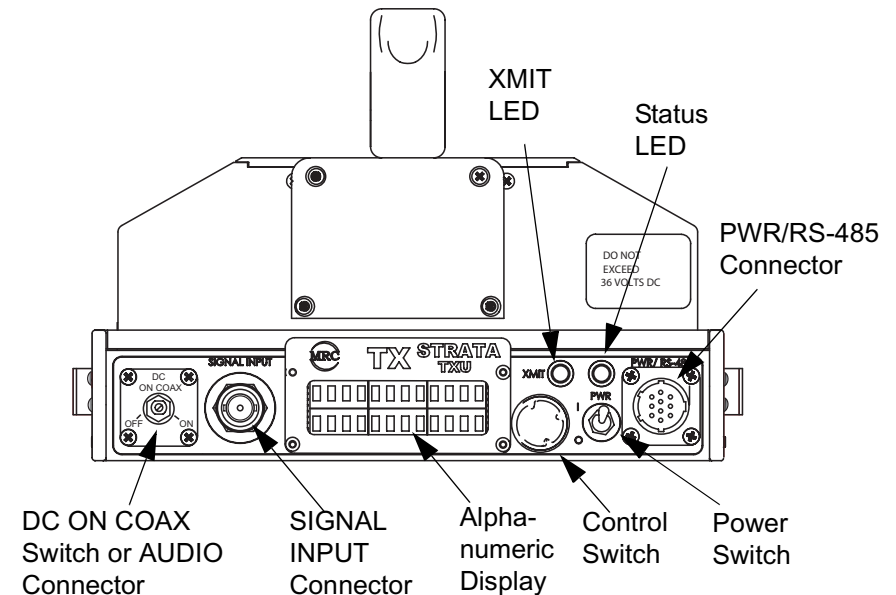
The TXU is configured using Windows PC-based STRATA TX Configuration Utility software. For details, see the "Advanced Operation" Chapter on page 5-1 (part of the STRATA TX System Technical Reference Manual only).

TXU Front Panel DC ON COAX Switch **DC ON COAX** switches are not contained on all configurations of the TXU. For configuration differences, see "TXU and TCU Configurations" Chapter on page 2-9.

If your STRATA TX System contains both a TXU and a TCU, the System allows you to power the TXU using DC power supplied from the TCU or allows you to power the TCU using DC power from the TXU. This DC power is superimposed on the coaxial cable between the TCU and the TXU. This DC power option is

used when the TCU and the TXU must be deployed in two separate locations.

Figure 3-2: TXU Controls, Indicators, and Connectors - Rear View
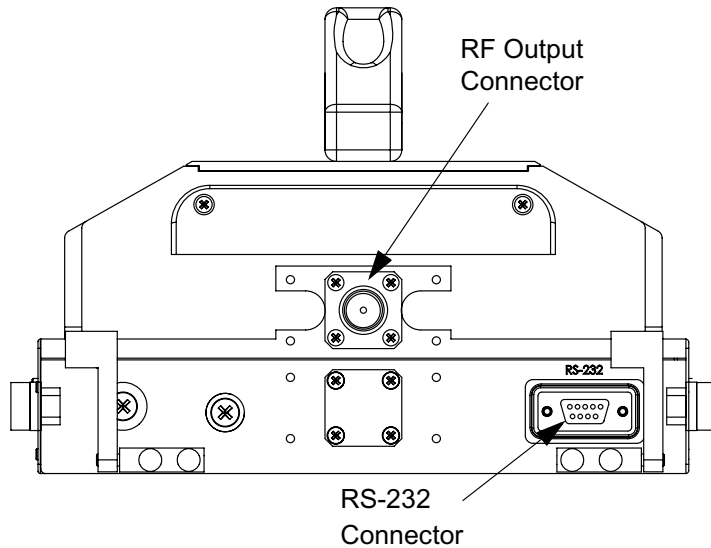
When the TCU and TXU are co-located, MRC recommends both units be powered from the same DC power source.

If your STRATA TX System does not contain a TCU, the **DC ON COAX** switch will not be present and an **AUDIO** connector will be mounted in place of the switch.

If your STRATA TX System contains both a TXU and a TCU, the System gives you several ways to control DC power on the coaxial cable from the TCU to the TXU, depending on the configurations of your TCU and TXU:

- The **DC ON COAX** switch on the front panel of the TCU (See Figure 3-3 on page 3-6) and the **DC ON COAX**

switch on the front panel of the TXU (See Figure 3-1 on page 3-2).

- The **75 Ohm Coax** option on the Command Screen.

Both control methods must be enabled for DC power to be operational if your TCU and TXU configurations both contain the **DC ON COAX** switches. If the **DC ON COAX** switch is not present on your TCU, DC power can only be applied using the **75 Ohm Coax** option on the command screen. The TXU **DC ON COAX** switch must be set to **ON** in either situation.

TXU SIGNAL INPUT Connector The BNC **INPUT** connector provides the IF or video input to the TXU.

TXU AUDIO Connector **AUDIO** connectors are not contained on all configurations of the TXU. For configuration differences, see "TXU and TCU Configurations" Chapter on page 2-9.

If your TXU contains an **AUDIO** connector, all audio inputs are applied to the front panel mounted 10-pin connector.

TXU Alphanumeric Display The TXU contains a two-line by 12-character alphanumeric display. The display works in conjunction with the control switch to allow you to monitor system status and to control system settings.

TXU XMIT LED When the TXU control switch is pressed for one second, the transmitter changes from the standby mode to the transmit mode or changes from the transmit mode to the standby mode. When the transmitter is in the transmit mode, the **XMIT** LED illuminates blue. When the transmitter is in the standby mode, the **XMIT** LED is off.

If your STRATA TX System contains both a TXU and a TCU, pressing the control switch on either the TXU or TCU will change the transmitter to the transmit mode or to the standby mode. The

XMIT LED on both units will be on or off, depending on the operating mode.

TXU Status LED Above the **PWR** switch on both the TXU and TCU is a multi-color Status LED. The LED indications are as follows:

LED Color	Meaning
-----	**Power is not on in that unit.**
Green	**Power is on and no errors are detected.**
Amber	**Minor Alarm - Power is on but some part of the system reports an abnormal condition that might impair performance.**
Red	**Major Alarm - Power is on but there is a failure or error that prevents normal operation.**

WARNING	A **Major Alarm** may also indicate a potential safety hazard. Shut down the STRATA TX System and disconnect power.

TXU PWR/RS-485 Connector The TXU **PWR/RS-485** connector mounted on the front panel of the unit allows the TXU to operate on external +28 VDC power sources.

TXU PWR Switch The front panel **PWR** (power) switch controls application of DC power to the TXU. If your STRATA TX System contains both a TXU and an TCU, both **PWR** switches must be turned on for the system to function.

TXU Control Switch Routine operating settings are controlled by the control switch. Turning the control switch right (cw) or left (ccw) displays status and settings and pressing it in makes selections, as described below:

	Turning the control switch to the right (cw) displays the Monitor options. **The Monitor options provide current status of the STRATA TX System, including:** • Frequency Settings • Mode - Analog or Digital • Audio Settings • Video Settings • System Errors.
	Turning the control switch to the left (ccw) displays the Command options. **The Command options allow control of the STRATA TX System, including:** • Changing the Preset • Setting the RF Channel • Set Power Output • Select **75 Ohm Coax Power On** or **Power Off** (Turns power from TCU to TXU or TXU to TCU on or off if DC power is superimposed on the coaxial cable between the TCU and the TXU).

Pressing the control switch causes an action to occur.

Command Options

- If the displayed setting is **Chng Preset**, **Set Channel**, or **Set PowerOut**, pressing the control switch causes the displayed setting to blink.
  Turning the control switch cw or ccw then displays the other options for that setting. When the desired option is displayed, pressing the control switch selects that option.

- If the displayed setting is **75 Ohm Coax**, pressing the control switch causes the setting to switch to the other choice (i.e., if **75 Ohm Coax Power Off** is displayed, pressing the control switch will select **75 Ohm Coax Power On**).

Transmit

- Pressing the control switch for one second changes the transmitter to the transmit mode from the standby mode.

- Pressing the control switch for one second changes the transmitter from the transmit mode to the standby mode.

TXU RF Output Connector The RF output connector is a type N connector that allows connection to an antenna.

TXU RS-232 Connector The **RS-232** connector provides connection to a Windows-based PC when using the STRATA TX Configuration Utility software.

This connector also provides connection to the STRATA Standard or Aircraft Remote Control Panel when used in mobile or aircraft operations.

3.2.2   TCU Controls, Indicators, and Connectors

Controls, indicators, and connectors contained on the TCU are identified and described below. Topics covered are as follows:

Topic	Page
TCU Alphanumeric Display	3-6
TCU XMIT LED	3-6
TCU Status LED	3-6
TCU PWR Switch	3-6
TCU DC ON COAX Switch	3-6
TCU Control Switch	3-7
TCU RS-232 Connector	3-8
TCU POWER Connector	3-8
TCU SIGNAL OUT Connector	3-8
TCU Monitor (MON) Connector	3-8
TCU SIGNAL IN Connector	3-8
TCU AUDIO Connector	3-8

Each of these controls, indicators, and connectors are described in the following paragraphs. Controls, indicators, and connectors contained on the TCU are shown in Figure 3-3 on page 3-6. For configuration differences in the TCU, see "TXU and TCU Configurations" on page 2-9.

The TCU is configured using Windows PC-based STRATA TX Configuration Utility software. For details, see the "Advanced Operation" Chapter on page 5-1 chapter (part of the STRATA TX System Technical Reference Manual only).

TCU Alphanumeric Display The TCU contains a two-line by 12-character alphanumeric display. The display works in conjunction with the control switch to allow you to monitor system status and to control system settings.

Figure 3-3: TCU Controls, Indicators, and Connectors

(Front View)

RS-232 Connector
Alphanumeric Display
XMIT LED
Status LED
PWR Switch
Control Switch
DC ON COAX Switch

POWER Connector
SIGNAL OUT Connector
Monitor (MON) Connector

(Rear View)

SIGNAL IN Connector
AUDIO Connector

mode. The **XMIT** LED on both units will be on or off, depending on the operating mode.

TCU Status LED Above the **PWR** switch on both the TXU and TCU is a multi-color Status LED. The LED indications are as follows:

LED Color	Meaning
-----	**Power is not on in that unit.**
Green	**Power is on and no errors are detected.**
Amber	**Minor Alarm - Power is on but some part of the system reports an abnormal condition that might impair performance.**
Red	**Major Alarm - Power is on but there is a failure or error that prevents normal operation.**

WARNING A **Major Alarm** may also indicate a potential safety hazard. Shut down the STRATA TX System and disconnect power.

TCU XMIT LED When the TCU control switch is pressed for one second, the transmitter changes from the standby mode to the transmit mode or from the transmit mode to the standby mode. When the transmitter is in the transmit mode, the **XMIT** LED illuminates blue. When the transmitter is in the standby mode, the **XMIT** LED is off.

If your STRATA TX System contains both a TXU and a TCU, pressing the Control switch on either the TXU or TCU will change the transmitter to the transmit mode or to the standby

TCU PWR Switch The front panel **PWR** (power) switch controls application of DC power to the TCU. If your STRATA TX System contains both a TXU and an TCU, both **PWR** switches must be turned on for the system to function.

TCU DC ON COAX Switch **DC ON COAX** switches are not contained on all configurations of the TCU. For configuration differences, see "TXU and TCU Configurations" on page 2-9.

If your STRATA TX System contains both a TXU and a TCU, the System allows you to power the TXU using DC power supplied from the TCU or to power the TCU using DC power from the

TXU. This DC power is superimposed on the coaxial cable between the TCU and the TXU. This DC power option is used when the TCU and the TXU must be deployed in two separate locations.

When the TCU and TXU are co-located, MRC recommends both units be powered from the same DC power source.

If your STRATA TX System does not contain a TXU, the **DC ON COAX** switch may not be present. If the switch is present, it should be set to the **OFF** position.

If your STRATA TX System contains both a TXU and a TCU, the System gives you several ways to control DC power on the coaxial cable between the TCU and the TXU, depending on the configurations of your TCU and TXU:

- The **DC ON COAX** switch on the front panel of the TCU (See Figure 3-3 on page 3-6) and the **DC ON COAX** switch on the front panel of the TXU (See Figure 3-1 on page 3-2).

- The **75 Ohm Coax** option on the Command Screen.

Both control methods must be enabled for DC power to be operational if your TCU and TXU configurations contain the **DC ON COAX** switches. If the **DC ON COAX** switch is not present on your TCU, DC power can only be applied using the **75 Ohm Coax** option on the command screen. The TXU **DC ON COAX** switch must be set to **ON** in either situation.

TCU Control Switch Routine operating settings are controlled by the control switch. Turning the control switch right (cw) or left (ccw) displays status and settings and pressing it in makes selections, as described below:

	Turning the control switch to the right (cw) displays the Monitor options. **The Monitor options provide current status of the STRATA TX System, including:** • Frequency Settings • Mode - Analog or Digital • Audio Settings • Video Settings • System Errors.
	Turning the control switch to the left (ccw) displays the Command Screens. **The Command Screens allow control of the STRATA TX System, including:** • Changing the Preset • Setting the RF Channel • Set Power Output • Select **75 Ohm Coax Power On** or **Power Off** (Turns power from TCU to TXU or TXU to TCU on or off if DC power is superimposed on the coaxial cable between the TCU and the TXU).

Pressing the control switch causes an action to occur.

Command Options

- If the displayed setting is **Chng Preset**, **Set Channel**, or **Set PowerOut**, pressing the control switch causes the displayed setting to blink.
  Turning the control switch cw or ccw then displays the other options for that setting. When the desired option is displayed, pressing the control switch selects that option.

- If the displayed setting is **75 Ohm Coax**, pressing the control switch causes the setting to switch to the other choice (i.e., if **75 Ohm Coax Power Off** is displayed, pressing the control switch will select **75 Ohm Coax Power On**).

Transmit

- Pressing the control switch for one second changes the transmitter to the transmit mode from the standby mode.

- Pressing the control switch for one second changes the transmitter from the transmit mode to the standby mode.

TCU RS-232 Connector The **RS-232** connector provides connection to a Windows-based PC when using the STRATA TX Configuration Utility software.

This connector also provides connection to the STRATA Standard or Aircraft Remote Control Panel when used in mobile or aircraft operations.

TCU POWER Connector The TCU **POWER** connector mounted on the rear panel of the unit allows the TCU to operate on external +28 VDC power sources.

TCU SIGNAL OUT Connector The TNC type **SIGNAL OUT** connector provides ASI, CODFM - IF, IF, or IF composite video output signals, depending upon the options contained in the unit. In addition, if the TCU is used in conjunction with a separately located TXU, DC power to or from the TXU is superimposed on the output signal coaxial cable between the TXU and TCU.

TCU Monitor (MON) Connector If your TCU has COFDM/MPEG installed, this rear panel output connector can be configured (when operating in the digital mode) to provide either:

- 70 MHz IF

- ASI (output of COFDM modulator, before decoding)

If your TCU is equipped with an analog modulator, this connector provides only the 70 MHz IF signal output.

TCU SIGNAL IN Connector Video connections are made to the BNC **SIGNAL IN** connector.   Video input selections are made by selecting Presets from the front panel control switch. Presets are created using the STRATA TX Configuration Utility software. For more information, see the "Advanced Operation" Chapter on page 5-1 (part of the STRATA TX System Technical Reference Manual only).

TCU AUDIO Connector Audio connections are made to the rear panel **AUDIO** connector.

3.2.3   ACU Controls, Indicators, and Connectors

Controls, indicators, and connectors contained on the optional ACU are identified and described below. Topics covered are as follows:

Topic	Page
ACU AC INPUT Connector	3-9
ACU Power LED	3-9
ACU Power LED	3-9
ACU DC OUTPUT Connector	3-9
ACU FUSE	3-9

Each of the controls, indicators, and connectors are described in more detail in the following paragraphs. Controls, indicators, and connectors contained on the ACU are shown in .

ACU AC INPUT Connector The **AC INPUT** connector mounted on the rear panel of the unit provides external AC power to the unit.

ACU POWER Switch The front panel **POWER** switch controls application of DC power to the **DC OUTPUT** connector. When the switch is set to **I** (on), DC power is present at the **DC OUTPUT** connector. When set to **0** (off), no output DC power is present at the **DC OUTPUT** connector.

ACU Power LED The power LED is on when the **POWER** switch is set to **I** (on), indicating DC power is available at the **DC OUTPUT** connector. The indicator is off when the **POWER** switch is set to **0** (off).

ACU DC OUTPUT Connector The **DC OUTPUT** connector mounted on the front panel of the unit provides +28 VDC power to the TCU and/or TXU.

ACU FUSE The fuse provides overload protection for AC input power.

Figure 3-4: ACU Controls, Indicators, and Connectors
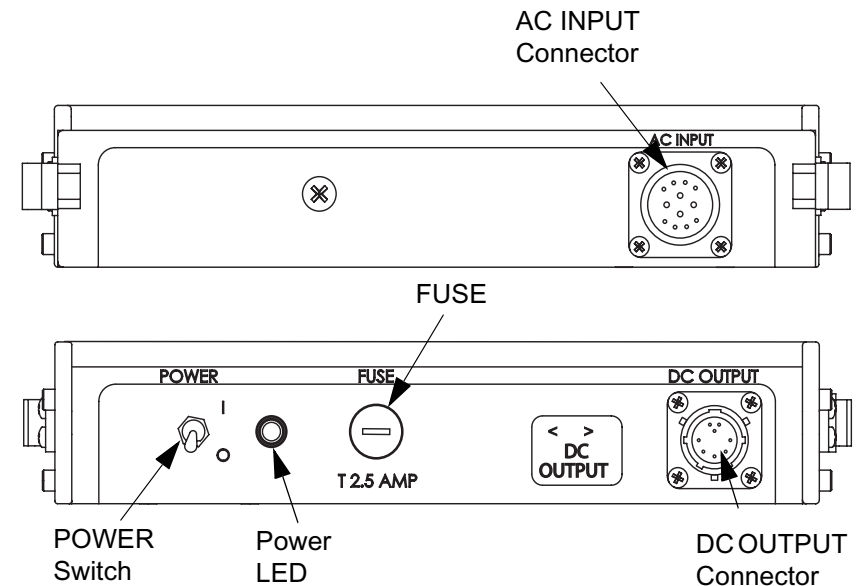
3.2.4 STRATA Standard Remote Control Panel Controls, Indicators, and Connectors

For controls, indicators, and connectors contained on the optional Standard Remote Control Panel, refer to the STRATA Remote Control Panel Operator's Guide, Document number 400489.

3.2.5 STRATA Aircraft Remote Control Panel Controls, Indicators, and Connectors

For controls, indicators, and connectors contained on the optional STRATA Aircraft Remote Control Panel, refer to the STRATA Aircraft Remote Control Panel Operator's Guide, Document number 400490.

3.3   Preparing for Operation

Each installation or deployment will have its own specific tasks according to the application and the installed hardware.

3.3.1   Mobile Installation

For mobile applications such as aircraft or vehicle, the STRATA TX System is usually mounted in a bulkhead or compartment using an MRC Fixed Mounting Bracket. See Figure 3-5. Mounting brackets are available to mount from one to three units.

Figure 3-5: Fixed Mounting Bracket
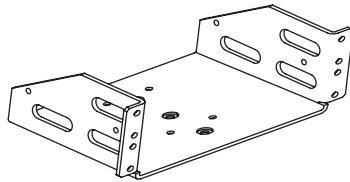
The cabling is permanently installed and power comes from aircraft (or vehicle) power.

3.3.2   Portable Deployment

For situations where you need to mount a STRATA TX System and its Fixed Mounting Bracket to an MRC tripod, MRC also offers a Quick Release. See Figure 3-6.

For situations where you are mounting to another type of tripod that doesn't directly accept the Quick Release, consult with MRC or your tripod manufacturer. MRC has Dovetail Adapter Plates that will convert some types of tripods to accept the Quick Release.

Figure 3-6: Fixed Mounting Bracket on Tripod

Fixed Mounting Bracket

Quick Release

MRC Tripod (Typical)
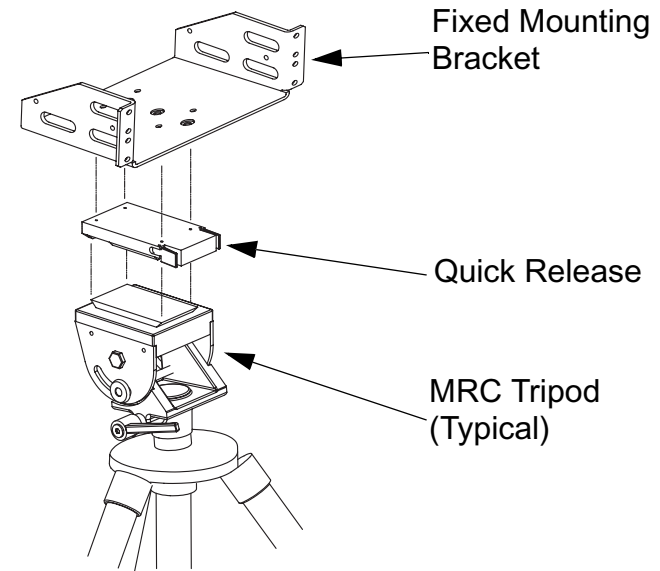
Note	The versatility of the Quick Release Mount and mating Dovetail Adapter Plate allows the Dovetail Adapter Plate to be attached to the bottom of the Universal Mounting Bracket and the Quick Release Mount to be attached to a non-MRC tripod, or vice versa.
	For optional methods of attaching your STRATA TX System to a non-MRC tripod, refer to the "Installation" Chapter on page 6-1 (part of the STRATA TX System Technical Reference Manual only)

For portable applications where the STRATA TX System will be moved from place to place and set up each time, the system will

usually be mounted in an MRC Universal Mounting Bracket. The Universal Mounting Bracket will then be attached to a Quick Release for easy mounting on an MRC tripod. See Figure 3-7.

Universal Mounting Brackets are required for each unit in the STRATA TX System, i.e., TXU, TCU, and an optional ACU.

For applications using multiple units such as a TXU, TCU, and an ACU, a Mounting Plate is also used to provide additional stiffness. The Mounting Plate typically remains attached between the Universal Mounting Bracket and the Quick Release.

The cabling between TX System units is also typically left in place. The power, antenna and audio/video connections are usually removed at the end of each deployment.

For portable deployment situations where you are mounting to another type of tripod that doesn't directly accept the Quick Release, consult with MRC or your tripod manufacturer. MRC has Dovetail Adapter Plates that will convert some types of tripods to accept the Quick Release.

Note   The procedures and illustrations contained in the following paragraph are typical, reflecting use of an MRC tripod.

Mounting to the Tripod Following are the general steps to mount a STRATA TX System to an MRC Tripod. These steps assume the TX System is already assembled into its Universal Mounting Bracket(s), and that the Mounting Plate and Quick Release are attached.

Figure 3-7: Universal Mounting Bracket on Tripod

- Universal Mounting Bracket
- Mounting Plate (for TXU, TCU, and ACU)
- Quick Release
- MRC Tripod (Typical)

1.   Attach the TX System to the Tripod using the Quick Release as shown in Figure 3-8 on page 3-12.

2.   Attach the antenna to the TXU using the Antenna Lock Plate, or connect a coaxial cable from the TXU to the antenna. See Figure 3-9 on page 3-12.

Figure 3-8: Attaching Quick Release to Tripod

Quick Release

Tripod
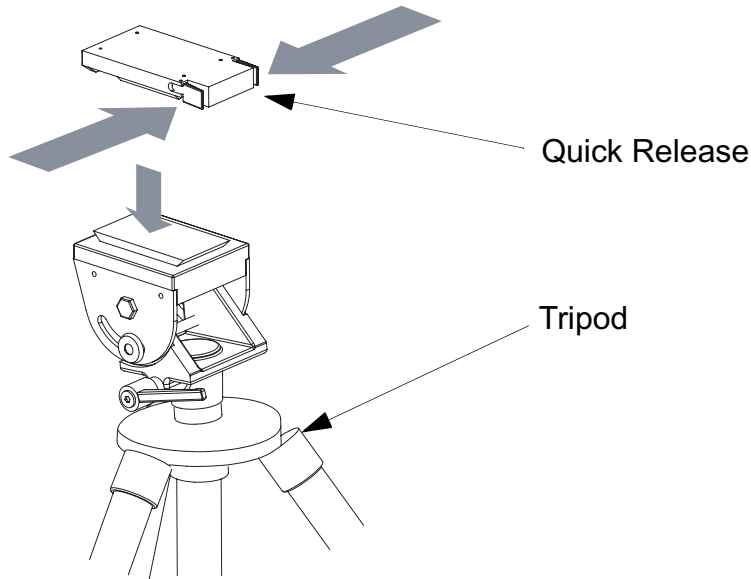
3. If you have both an TXU and a TCU, be sure they are connected to each other via coaxial cable.

   If you are unsure of the connections, refer to the "Installation" Chapter on page 6-1 (part of the STRATA TX System Technical Reference Manual only).

4. Connect the STRATA TXU (and TCU, if present) to DC power of the correct voltage and polarity.

   If you're using a STRATA ACU, connect the AC input to AC power and connect the DC output to the TXU and TCU.

   If you are unsure of the power requirements or the connections, refer to the "Installation" Chapter on

(part of the STRATA TX System Technical Reference Manual only).

5. Connect the TXU (or TCU) inputs to your audio and video equipment.

Figure 3-9: Complete Tripod Installation

TXU

TCU

ACU

Antenna (2 Options Shown)

Universal Mounting Brackets

Mounting Plate

Quick Release

Tripod (Typical)
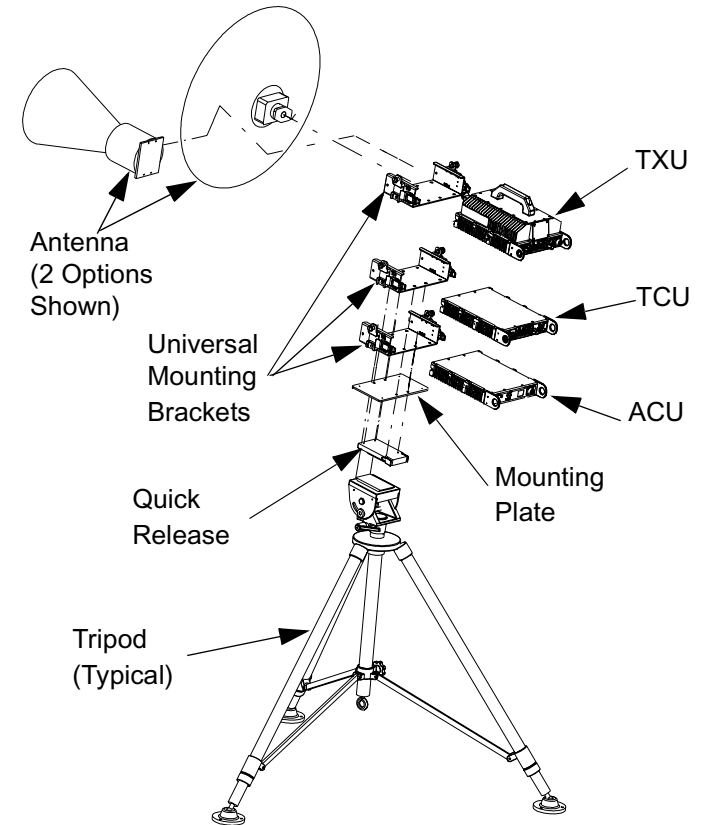
3.3.3 Powering the STRATA TX System

The STRATA TX System will be in one of two configurations which provide different options for controlling application of DC power between units. Model variations are as follows:

Superimposing DC Power In this configuration, DC power is superimposed with the IF signals between units and there is no manual control of DC power from the TCU. The DC power is superimposed on the coaxial cable between the TCU and the TXU.

To turn DC power on and off, the operator uses the TCU and TXU front panel **PWR** switches and either the TCU or TXU control switch and alphanumeric display menus. The TXU **DC ON COAX** switch must be set to **ON**.

Superimposing DC Power with Manual Control In this configuration, DC power superimposed on the IF signals between the units is manually controlled. The operator can manually turn DC power on or off to the TXU from the TCU or to the TCU from the TXU using **DC ON COAX** switches and TCU or TXU front panel control switches and alphanumeric display menus.

The **DC ON COAX** switches provide the manual control and must be set to **ON** to allow application of DC power to the TXU , and TCU using the control switches and alphanumeric display menus.

Powering STRATA TX Systems The method you use to power up your STRATA TX System will vary, depending upon the following:

- The model of your STRATA TX System, whether or not you have DC power manual override control.

- The transmitter configuration, whether you are using a single TCU, a single TXU, or a TCU and TXU

- Whether the TCU and TXU are to be co-located or physically separated over some distance.

- Whether your STRATA TX System contains the optional AC to DC Power Converter (ACU).

3.3.4   Single TCU Power Up and Power Down

If your STRATA TX System consists of a single TCU, perform the following steps:

CAUTION   *To avoid possible damage, turn off DC Power on the coax before connecting any test equipment.*

Power Up

1. Verify the power cable is properly connected to the TCU rear panel **POWER** connector.

2. Verify all coaxial cables and connectors have been properly connected.

3. Connect the TCU to DC power of the correct voltage and polarity.

    If you are unsure of the power requirements or the connections, refer to the "Installation" Chapter on page 6-1 (Part of the STRATA TX System Technical Reference Manual only).

    If the TCU is powered from the optional STRATA ACU, connect the ACU input to AC power and verify the TCU power cable is connected to the ACU **DC OUTPUT** connector. Set the ACU power switch to **I** (on) and verify the ACU power LED is on.

    If the TCU is powered from a source other than an ACU, turn that power source on.

4. Set the TCU **PWR** switch to **I** (on).

---

5. The normal power-up sequence is as follows:

- The Status LED above the **PWR** switch should illuminate and should change colors from red, to green, to amber, and finally remain green.

- The alphanumeric display should light up and quickly display a self-test screen, then the version of the installed firmware, and finally the Main Screen. Some typical screens are shown in Figure 3-10. The exact screens will vary depending on installed hardware.

- The TCU will typically power up using the last settings in use when power was turned off.

- If the TCU does not power up normally, refer to the "Troubleshooting" Chapter on page 4-1.

Figure 3-10: Typical TCU Power Up Screens - Single TCU

Radio Version

```
STRATA TX

V X.X.X
```

Main Screen

```
Preset 1

0.00W
```

Power Down

1. Set the TCU **PWR** switch to **0** (off).
2. If the TCU is powered from the optional ACU, set the ACU power switch to **0** (off).

If the TCU is powered from a source other than an ACU, turn that power source off.

3.3.5   Single TXU Power up and Power Down

If your STRATA TX System consists of a single TXU, perform the following steps:

CAUTION   *To avoid possible damage, turn off DC Power on the coax before connecting any test equipment.*

Power Up

1. Verify the power cable is properly connected to the TXU front panel **POWER** connector.
2. Verify all coaxial cables and connectors have been properly connected.
3. Connect the TXU to DC power of the correct voltage and polarity.

   If you are unsure of the power requirements or the connections, refer to the "Installation" Chapter on page 6-1 (Part of the STRATA TX System Technical Reference Manual only).
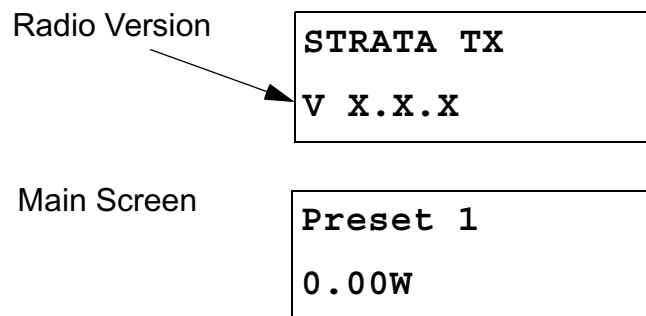
   If the TXU is powered from the optional STRATA ACU, connect the ACU input to AC power and verify the TXU power cable is connected to the ACU **DC OUTPUT** connector. Set the ACU power switch to **I** (on) and verify the ACU power LED is on.

If the TXU is powered from a source other than an ACU, turn that power source on.

4. Set the TXU **PWR** switch to **I** (on).
5. The normal power-up sequence is as follows:

   - The Status LED above the **PWR** switch should illuminate and should change colors from red, to green, to amber, and finally remain green.
   - The alphanumeric display should light up and quickly display a self-test screen, then the version of the installed firmware, and finally the Main Screen.

     Some typical screens are shown in Figure 3-11. The exact screens will vary depending on installed hardware.
   - The TXU will typically power up using the last settings in use when power was turned off.
   - If the TXU does not power up normally, refer to the "Troubleshooting" Chapter on page 4-1.

Figure 3-11: Typical TXU Power Up Screens - Single TXU

Radio Version

```
STRATA TX

V X.X.X
```

Main Screen

```
Preset 1

0.00W
```
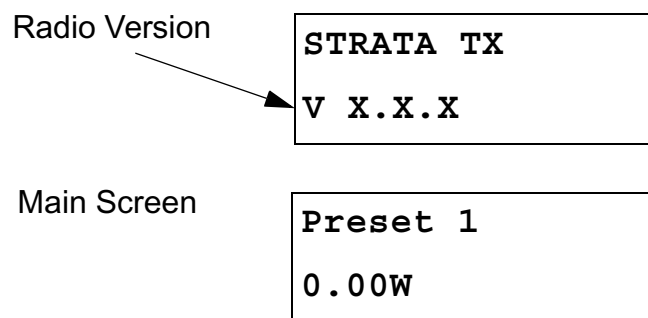
Power Down

1. Set the TXU **PWR** switch to **0** (off).
2. If the TXU is powered from the optional ACU, set the ACU power switch to **0** (off).

   If the TXU is powered from a source other than an ACU, turn that power source off.

3.3.6 TXU and TCU Power Up and Power Down - Co-Located

If your STRATA TX System consists of a co-located TXU and a TCU, it is recommended that both the TCU and TXU be powered from the same DC power supply in lieu of using superimposed DC power on the coaxial cable between the TCU and the TXU.

Note   The following procedure reflects use of a single DC power source for both the TXU and TCU in lieu of using superimposed DC power on the coaxial cable between the TCU and the TXU.

Perform the following steps to power up or power down a co-located TX System:

CAUTION   *To avoid possible damage, turn off DC Power on the coax before connecting any test equipment.*

Power Up

1. Verify the power cable is properly connected to the TCU rear panel **POWER** connector.

2. Verify the power cable is properly connected to the TXU front panel **POWER** connector.

   Note If your TCU does not have a **DC ON COAX** switch, go to step 4.

3. Turn the recessed **DC ON COAX** switch on the front panel of the TCU until the screw slot of the switch points to **OFF**.

4. Turn the recessed **DC ON COAX** switch on the front panel of the TXU until the screw slot of the switch points to **OFF**.

5. Verify all coaxial cables and connectors have been properly connected.

6. Connect the TCU and TXU to DC power of the correct voltage and polarity.

   If you are unsure of the power requirements or the connections, refer to the "Installation" Chapter on page 6-1 (Part of the STRATA TX System Technical Reference Manual only).

   If the TCU and TXU are both powered from the optional STRATA ACU, connect the ACU input to AC power and verify the TCU and TXU branched power cable is connected to the ACU **DC OUTPUT** connector. Set the ACU power switch to **I** (on) and verify the ACU power LED is on.

If the TCU and TXU are powered from a source other than an ACU, turn that power source on.

7. Set the TCU **PWR** switch to **I** (on).

8. The normal power-up sequence is as follows:

   - The Status LED above the **PWR** switch should illuminate and should change colors from red, to green, to amber, and finally remain green.

   - The alphanumeric display should light up and quickly display a self-test screen, then the version of the installed firmware, and finally the Main Screen. Some typical screens are shown in Figure 3-12. The exact screens will vary depending on installed hardware.

   - The TCU will typically power up using the last settings in use when power was turned off.

   - If the TCU does not power up normally, refer to the "Troubleshooting" Chapter on page 4-1.

Figure 3-12: Typical TCU Power Up Screens - Co-Located TXU and TCU

Radio Version

```
STRATA TX

V X.X.X
```

Main Screen

```
Preset 1

0.00W
```
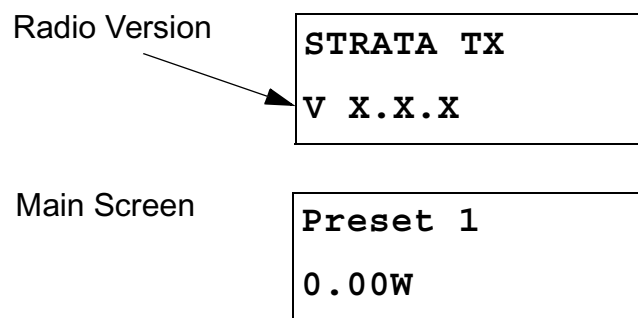
9. Set the TXU **PWR** switch to **I** (on).

10. The normal power-up sequence is as follows:

   - The Status LED above the **PWR** switch should illuminate and should change colors from red, to green, to amber, and finally remain green.

   - The alphanumeric display should light up and quickly display a self-test screen, then the version of the installed firmware, and finally the Main Screen. Some typical screens are shown in Figure 3-13. The exact screens will vary depending on installed hardware.

   - The TXU will typically power up using the last settings in use when power was turned off.
   If the TXU does not power up normally, refer to the "Troubleshooting" Chapter on page 4-1.

Figure 3-13: Typical TXU Power Up Screens - Co-Located TXU and TCU

Radio Version

```
STRATA TX

V X.X.X
```

Main Screen

```
Preset 1

0.00W
```

Power Down

1. Set the TXU **PWR** switch to **0** (off).
2. Set the TCU **PWR** switch to **0** (off).

3. If the TXU and TCU are powered from the optional ACU, set the ACU power switch to **0** (off).

   If the TCU and TXU are powered from a source other than an ACU, turn that power source off.

3.3.7 TXU and TCU Power Up and Power Down - Separate Locations

If your STRATA TX System consists of a TXU and a TCU and the TCU is located in a separate location from the TXU, the TXU will be powered using the superimposed DC power on the coaxial cable between the TCU and the TXU or the TCU will be powered using DC power superimposed on the coaxial cable from the TXU.

Perform the following steps to power up or power down a separately located TXU and TCU TX System:

CAUTION   *To avoid possible damage, turn off DC Power on the coax before connecting any test equipment.*

Power Up

1. Verify the power cable is properly connected to the TCU rear panel **POWER** connector.

   Note If your TCU does not have a **DC ON COAX** switch, go to step 3.

2. Turn the recessed **DC ON COAX** switch on the front panel of the TCU until the screw slot of the switch points to **ON**.

---

3. Turn the recessed **DC ON COAX** switch on the front panel of the TXU until the screw slot of the switch points to **ON**.

4. Verify all coaxial cables and connectors have been properly connected.

Note When the TCU and TXU are mounted in separate locations, it is recommended that DC input power be connected to the TXU.

Since either unit may be powered from the other unit via DC power superimposed on the coaxial cable between the units, DC input power may therefore be applied to either the TXU or the TCU.

5. Connect the TCU or TXU to DC power of the correct voltage and polarity.

If you are unsure of the power requirements or the connections, refer to the "Installation" Chapter on page 6-1 chapter (Part of the STRATA TX System Technical Reference Manual only).

If the TCU/TXU is powered from the optional STRATA ACU, connect the ACU input to AC power and verify the TCU/TXU power cable is connected to the ACU **DC OUTPUT** connector. Set the ACU power switch to **I** (on) and verify the ACU power LED is on.

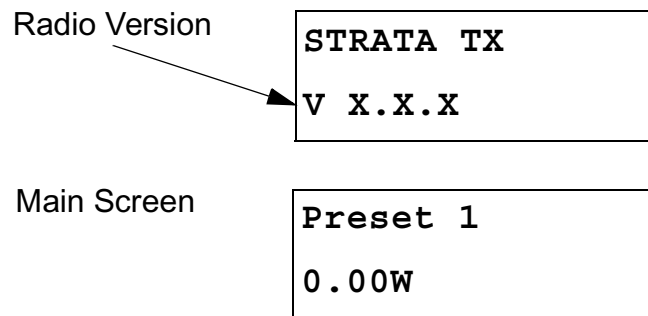If the TCU is powered from a source other than an ACU, turn that power source on.

6. Set the TCU **PWR** switch to **I** (on).

7. The normal power-up sequence is as follows:

- The Status LED above the **PWR** switch should illuminate and should change colors from red, to green, to amber, and finally remain green.

- The alphanumeric display should light up and quickly display a self-test screen, then the version of the installed firmware, and finally the Main Screen. Some typical screens are shown in Figure 3-14. The exact screens will vary depending on installed hardware.

- The TCU will typically power up using the last settings in use when power was turned off.

- If the TCU does not power up normally, refer to the "Troubleshooting" Chapter on page 4-1.

Figure 3-14: Typical TCU Power Up Screens - Separately Located TXU and TCU

Radio Version

```
STRATA TX

V X.X.X
```

Main Screen

```
Preset 1

0.00W
```
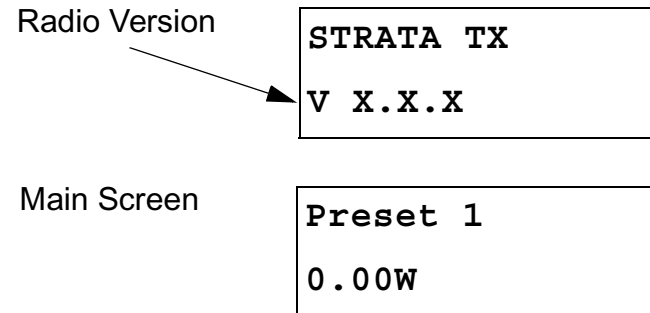
8. Rotate the TCU control switch ccw until the **75 Ohm Coax** option (Figure 3-15 on page 3-19) is displayed on the alphanumeric display.

Figure 3-15: 75 Ohm Coax Option

```
75 Ohm Coax

Power Off
```
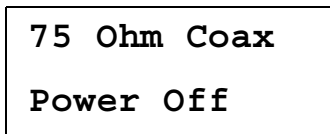
9.   Press control switch to change **Power Off** to read **Power On**, as required.

10.   Set the TXU **PWR** switch to **I** (on).

11.   The normal power-up sequence is as follows:

-    The Status LED above the **PWR** switch should illuminate and should change colors from red, to green, to amber, and finally remain green.

-    The alphanumeric display should light up and quickly display a self-test screen, then the version of the installed firmware, and finally the Main Screen. Some typical screens are shown in Figure 3-16. The exact screens will vary depending on installed hardware.

-    The TXU will typically power up using the last settings in use when power was turned off.

-    If the TXU does not power up normally, refer to the .

Figure 3-16: Typical TXU Power Up Screens - Co-Located TXU and TCU

Radio Version

```
STRATA TX

V X.X.X
```

Main Screen

```
Preset 1

0.00W
```
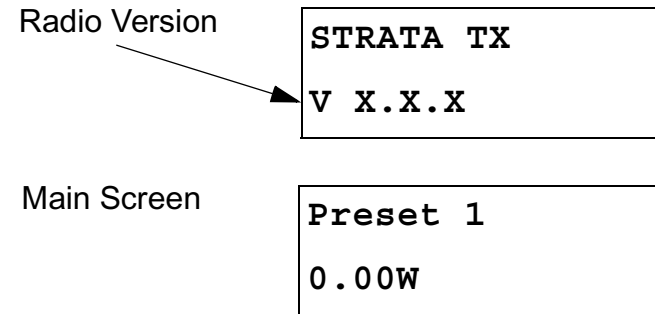
Power Down

1.   Set the TXU **PWR** switch to **0** (off).

2.   Set the TCU **PWR** switch to **0** (off).

3.   If the TCU/TXU is powered from the optional ACU, set the ACU power switch to **0** (off).

If the TCU/TXU is powered from a source other than an ACU, turn that power source off.

3.4   Using the STRATA TX Screens

As you use the STRATA TX System, you will interact extensively with the TXU and/or TCU screens. Following are some points to make this easier.

Main Screen The Main Screen is your starting point for navigating through the Monitor and Control option screens. The Main screen provides the current values of the Preset selected and the selected Preset output power level.

When the STRATA TX System completes its power-up sequence, it will display the Main Screen. A typical Main screen is shown in Figure 3-17.

Figure 3-17: Typical STRATA TX Main Screen
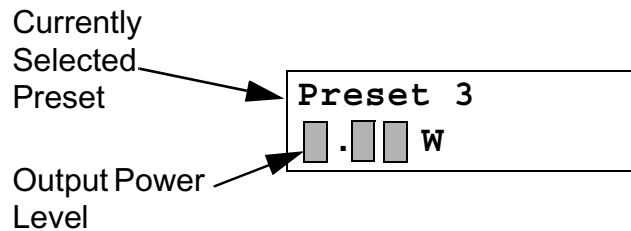
Accessing the Main Screen You can access the Main screen at any time by scrolling to the end of the screens you are viewing (either Monitor or Control). Your next click of the control switch will bring up the Main screen.

Accessing the Monitor Screen You can access the Monitor option screens at any time by turning the control switch clockwise (cw).

Accessing the Control Screen You can access the Control option screens at any time by turning the control switch counter-clockwise (ccw).

Default to Main Screen If you do not turn or push the control switch for a period of about 7 seconds, the display will default to the Main screen.

If you turn the control switch within those 7 seconds, you will continue scrolling within that set of screens (Monitor or Control).

Unit vs.System Control If you're using a standalone TXU or TCU, the menus and options that appear on the display will be based on the hardware option(s) installed in that individual unit.

When you connect your TCU and TXU, the two units automatically detect what hardware is installed in each unit, and automatically configure the menus and options to match the installed hardware. The connected STRATA TX System then allows you to control the entire system from either the TXU or the TCU front panel.

3.5   TXU and/or TCU Monitoring Operations

The STRATA TX System Presets are set to six possible modes of operation, based on the options contained in your TXU and/or TCU. These operating modes are established using the STRATA TX Configuration Utility software. The operating mode options available via the Configuration Utility software are as follows:

- MPEG Only ASI Out (**MPEG Output** mode) (Standalone TCU Operation Only)

- External 70MHz IF In (**Ext IF Input** mode)

- MPEG/COFDM IF Out (**COFDM - IF** mode)

- COFDM Only - ASI In (**COFDM ASI In** mode)

- Analog IF Output (**Analog - IF** mode)

- DVB-S (Satellite) (**DVB-S** mode) (Standalone TCU

Operation Only)

The options displayed on the Monitor Screens are in **bold** fonts.

Once the STRATA TX System is set up and powered up, you will be able to check its configuration and monitor its operation.

The following sections describe how to use the Monitor Screens and how to monitor the quality of the microwave link.

Here are the tasks described:

Topic	Page
Using the Monitor Screens in MPEG Output Mode	3-21
Using the Monitor Screens in Ext IF Input Mode	3-23
Using the Monitor Screens in COFDM - IF Mode	3-24
Using the Monitor Screens in COFDM ASI In Mode	3-25
Using the Monitor Screens in Analog - IF Mode	3-26
Using the Monitor Screens in DVB-S Mode	3-27

3.5.1   Using the Monitor Screens in MPEG Output Mode

When the STRATA TX System Preset selected is operating in the **MPEG Output** mode, a DVB ASI transport stream is supplied to the signal output connector and the monitor output connector. The **MPEG Output** mode is only available when the TCU is operated in a standalone configuration.

Figure 3-18: MPEG Output Monitor Menu Map

NOTE MPEG Output (MPEG Only - ASI Out) Monitor Menu is available only when TX System consists of a standalone TCU.

Monitor Menu Access:
TURN Control Switch cw to view Monitor options.

Main Screen

```
RF Not Found
[          ]
```
This line will display the same information as the Main Screen.

```
   Mode
MPEG Output
```
Displays will alternately appear if no video is present.

```
No Video          NTSC NoPdstl
Vid In 4:2:0      Vid In 4:2:0
```

```
Video Delay
  Normal
```

```
ASI Bit Rate
[        ] Mbs
```

```
AudioA MPEG
Analog Stereo
```

```
AudioB MPEG
Analog Stereo
```

```
ClrBar OFF
```

```
Error Page
```

```
Preset [ ]
[        ]
```

NOTE All Monitor Screens default to the Main Screen after 7 seconds of inactivity.

3.5.2 Using the Monitor Screens in Ext IF Input Mode

When the STRATA TX System is operating in the **Ext IF Input** mode, the 70 MHz IF input signal from the input connector is routed through the TCU to the TXU (if present).

See Figure 3-19 for the Ext IF Monitor Map.

Figure 3-19: Ext IF Input Monitor Map

Monitor Menu Access:
TURN Control Switch cw
to view Monitor options.

This line will display Frequency for Preset selected when RF is present.

This line will display the same information as the Main Screen.

Main Screen

Preset

If TXU is present, displays power level and channel number.

Mode
Ext IF Input

NOTE All Monitor Screens default to the Main Screen after 7 seconds of inactivity.

Error Page

3.5.3 Using the Monitor Screens in COFDM - IF Mode

When the STRATA TX System is operating in the **COFDM - IF** mode, 70 MHz COFDM IF output from the internal COFDM/

MPEG board is supplied to the output and monitor ports and to the TXU, if present.

See Figure 3-20 for the COFDM - IF Monitor Menu Map.

Figure 3-20: COFDM - IF Monitor Menu Map
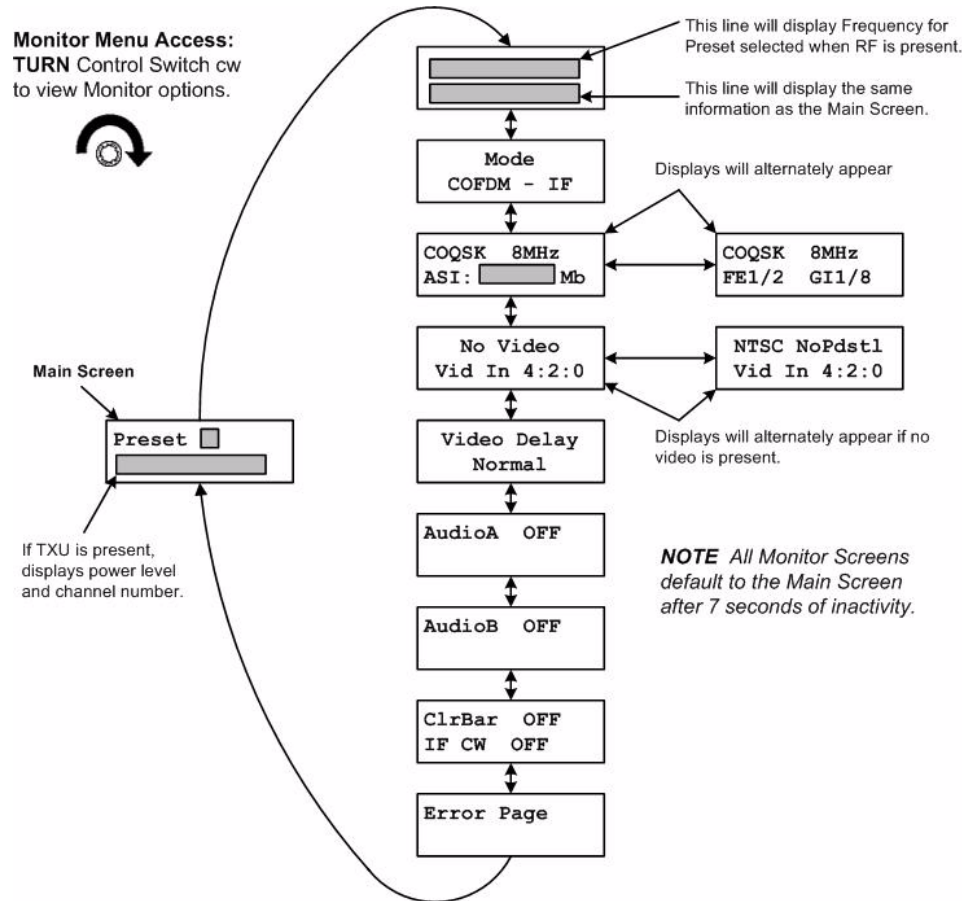
3.5.4 Using the Monitor Screens in COFDM ASI In Mode

When the STRATA TX System is operating in the **COFDM ASI In** mode, the internal MPEG encoder is bypassed and an externally supplied ASI stream is routed to the monitor and output connectors and then to the TXU, if present.

See Figure 3-21 for the COFDM ASI In Menu Map.

Figure 3-21: COFDM ASI In Monitor Map

Monitor Menu Access:
TURN Control Switch cw to view Monitor options.

This line will display Frequency for Preset selected when RF is present.

This line will display the same information as the Main Screen.

Mode
COFDM ASI In

Main Screen

Displays will alternately appear.

Preset

COQSK   8MHz
ASI: Mb

COQSK   8MHz
FE1/2   GI1/8

If TXU is present, displays power level and channel number.

IF CW OFF

NOTE All Monitor Screens default to the Main Screen after 7 seconds of inactivity.

Error Page
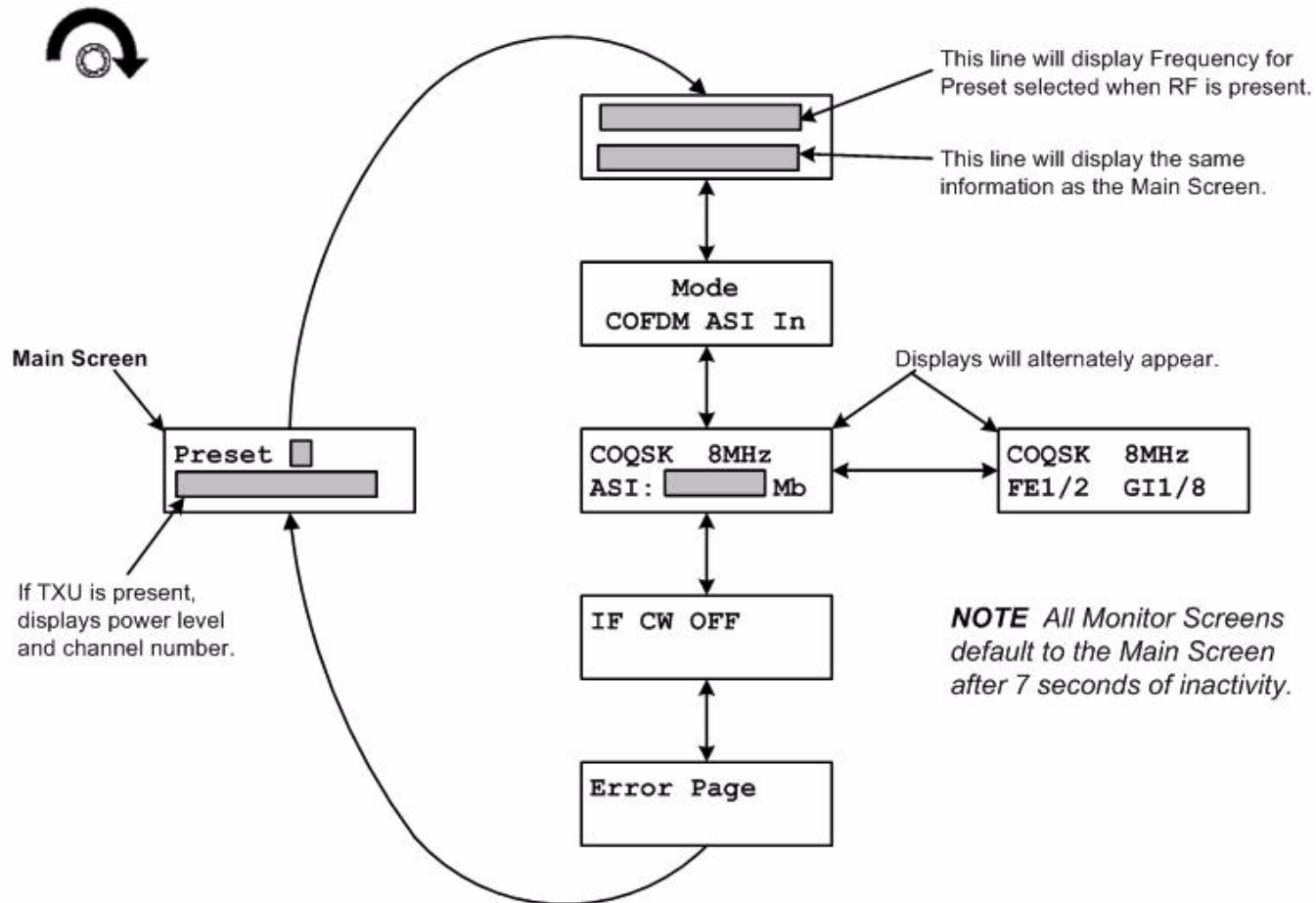
3.5.5 Using the Monitor Screens in Analog - IF Mode

When the STRATA TX System is operating in the **Analog - IF** mode, 70 MHz FM output is routed to the TXU, if present. This option is only available if the FMT option is installed.

See Figure 3-22 for the Analog - IF Monitor Menu Map.

Figure 3-22: Analog - IF Monitor Menu Map
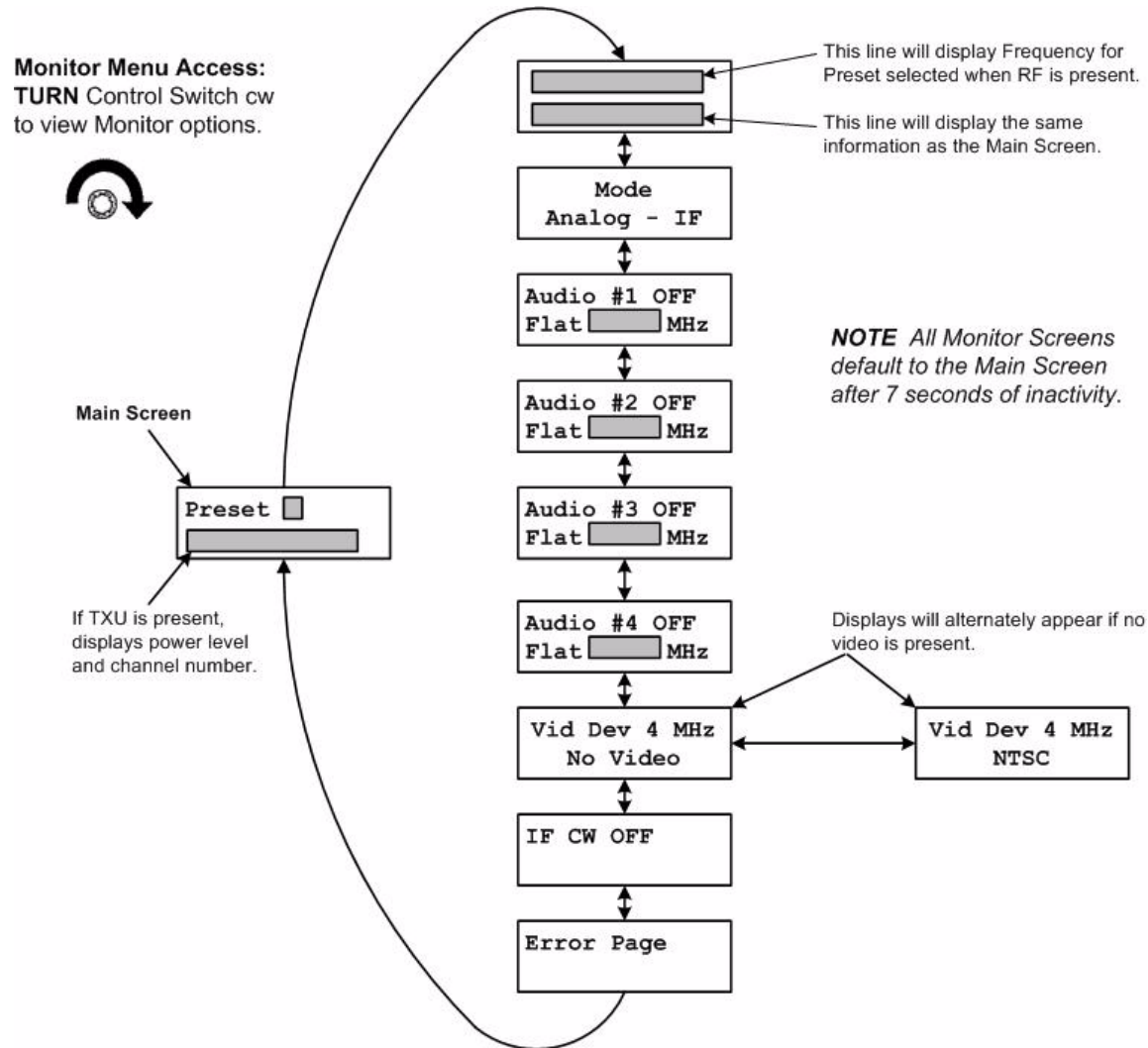
3.5.6 Using the Monitor Screens in DVB-S Mode

When the STRATA TX System is operating in the **DVB-S** mode, this mode utilizes a single carrier modulator and supplies a configurable DVB-S signal to the TCU signal output and monitor connectors. This mode is operational for QPSK, 16 QAM, and 8 PSK modulation formats. This mode is used for standalone TCU operations only.

See Figure 3-23 for the DVB-S Monitor Menu Map.

Figure 3-23: DVB-S Monitor Menu Map

NOTE DVB-S (DVB-S (Satellite)) Monitor Menu is available only when TX System consists of a standalone TCU.

Monitor Menu Access:
TURN Control Switch cw to view Monitor options.

Main Screen

Preset

RF Not Found

This line will display the same information as the Main Screen.

Mode
DVB-S

QPSK
ASI   Mb

QPSK
FE1/2

QPSK   SR16
@ .35   70MHz

Displays will alternately appear

No Video
Vid In 4:2:0

NTSC NoPdstl
Vid In 4:2:0

Video Delay
Normal

AudioA OFF

MPEG AudioB
Tone Stereo

NOTE All Monitor Screens default to the Main Screen after 7 seconds of inactivity.

ClrBar OFF
IF CW OFF

Error Page

3.6   TXU and/or TCU Control Operations

This section describes how to configure your STRATA TX System using the front panel control switch. Turning the front panel control switch counterclockwise on either the TXU or TCU controls transmitter functions including changing Presets, changing RF channel assignments, setting RF attenuation levels, and activation of DC power from a TCU to a separately located TXU, or from a TXU to a separately located TCU.

Settings may be changed on a standalone TCU, a standalone TXU, or a TXU and TCU TX System.

For a summary of settings that can be changed using the front panel control switch and which are made using the STRATA TX Configuration Utility software, see "Front Panel vs. STRATA TX Configurator Settings" on page 3-35.
Here are the tasks described:

Topic	Page
Changing a Preset	3-30
Setting a Channel	3-31
Setting Power Output	3-32
Controlling TCU to TXU DC Power on Coax	3-33

Refer to Figure 3-24 on page 3-29 for the Control Menu Map.

Figure 3-24: Control Menu Map Changing a Preset

Control Menu Access:
TURN Control Switch ccw and **PRESS** to activate.

Main Screen

```
Preset ☐
[              ]
```

If TXU is present, displays power level and channel number.

1) **PRESS** to activate
2) **TURN** to change
3) **PRESS** to select

```
Chng Preset
Preset 1
```

```
Select Preset
1 thru 9
```

Returns to Main Screen after **PRESS** to select.

1) **PRESS** to activate
2) **TURN** to change
3) **PRESS** to select

```
Set Channel
Not on Chnl
```

```
Select
Channel Ch -1
thru +10
```

1) **PRESS** to activate
2) **TURN** to change
3) **PRESS** to select

```
Set PowerOut
Attn:
```

```
Select 0 to -
31 dB
Attenuation
```

NOTE All Control Screens default to the Main Screen after 7 seconds of inactivity.

NOTE Message is displayed, but option is not active on 3.4 to 13.25 GHz TX Systems.

```
HPU Coax
No HPU
```

PRESS to select **Power Off** or **Power On**

```
75 Ohm Coax
Power Off
```

```
75 Ohm Coax
Power On
```

CAUTION
Turn off DC power on coax (HPU Coax and 75 Ohm Coax) before connecting test equipment.

3.6.1   Changing a Preset

The STRATA TX is designed to enable you to control operating settings through Presets stored in the transmitter. The STRATA TCU and TXU are shipped with factory Presets and can be customized for the user.

Your STRATA TX System can be pre-configured with up to 9 Presets. Each Preset contains most of the operating settings needed to control the STRATA TX System. System Presets can only be defined and changed using the STRATA TX Configuration Utility software. Presets cannot be changed from the TXU or TCU front panels.

For information on configuring Presets, see the "Configurator Reference" Appendix on page C-1 (part of the STRATA TX Technical Reference Manual only).

Notes	When you change a Preset, the new Preset remains in effect. When the TX System is powered down, that Preset is active when the TX System is powered up again.
	When a Preset is changed, the channel does not change.
	When a channel is changed, the Preset does not change.

To change Presets, perform the following steps:

1.   Verify the STRATA TX System is connected and powered up. See "Powering the STRATA TX System" on page 3-12.

2.   Observe the Main Screen is displayed. See Figure 3-25.

Figure 3-25: Main Screen - Changing a Preset

```
Preset 3
□.□ □ W
```
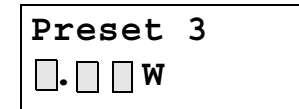
3.   Turn the control switch ccw until the display reads **Chng Preset**.

Note	Changing Presets when the TX System is in the transmit mode will place the transmitter in the standby mode when the control switch is pressed.

---

4.   Press the control switch to select **Chng Preset**. See Figure 3-26.

Figure 3-26: Change Preset Screen (Typical)

```
Chng Preset          Blinking
Preset 1◄
```

5.   Observe the current Preset setting begins to blink.
6.   Turn the control switch cw or ccw until the desired Preset is displayed.
7.   Press the control switch once to select that Preset.
8.   Observe display changes back to the Main Screen after a short delay.
9.   Observe newly selected Preset is displayed on Main screen. See Figure 3-27 on page 3-31.

Figure 3-27: Main Screen (Typical) - Preset Changed

```
┌─────────────────┐
│ Preset  ☐◀───── New
│ ☐.☐ ☐ W          Preset
└─────────────────┘
```
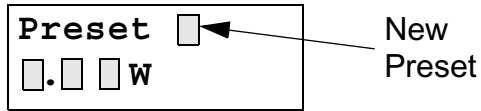
10.   Press the control switch for one second to place the TX System in the transmit mode, as required.

3.6.2   Setting a Channel

The STRATA TX channel and offset, other than the Preset channel pre-programmed using the STRATA TX Configuration Utility software, can be selected from the TXU or TCU front panel and can be configured for operation on any of up to 10 channels, with (+) and (-) offsets. For more information, see the "Channels & Frequencies" Appendix on page A-1.

The frequencies assigned to each channel must be configured using the STRATA TX Configuration Utility software. The frequencies cannot be changed from either the TXU or TCU front panels.

For information on configuring channels, see the "Configurator Reference" Appendix on page C-1 (part of the STRATA TX System Technical Reference Manual only).

Notes   The Preset will retain the new channel until the TX System is powered off. When the TX System is powered up again, the new channel setting will be retained.

When a Preset is changed, the channel does not change.

When a channel is changed, the Preset does not change.

To select which channel to modify, perform the following steps:

1.   Verify the STRATA TX System is connected and powered up. See "Powering the STRATA TX System" on page 3-12.

2.   Observe the Main screen is displayed. See Figure 3-28.

Figure 3-28: Main Screen

```
┌─────────────────┐
│ Preset 3         │
│ ☐.☐ ☐ W          │
└─────────────────┘
```
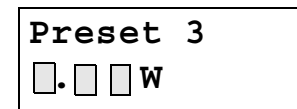
3.   Turn the control switch ccw until the display reads **Set Channel**. See Figure 3-29.

Figure 3-29: Change a Channel (Typical)

```
┌─────────────────┐
│ Set Channel      │
│                  │
│ Not On Chnl      │
└─────────────────┘
```
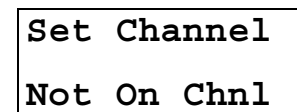
| Note	Changing Channels when the TX System is in the transmit mode will place the transmitter in the standby mode when the control switch is pressed.

4. Press the control switch once to select **Set Channel** and observe the channel selected begins to blink.

5. Turn the control switch cw or ccw until the desired channel and offset are displayed.

6. Press the control switch once to select that channel and offset.

7. Observe the display changes back to the Main screen after a short delay.

8. Press the control switch for one second to place the TX System in the transmit mode, as required.

3.6.3   Setting Power Output

The power output of your STRATA TX System can be set by controlling the attenuation, in dB, from either the TXU or TCU front panel.

Note	Maximum power output occurs with 0 dB of attenuation selected. Attenuation levels from 0 dB to -31 dB may be selected in 1 dB increments.

To select power output attenuation, perform the following steps:

1. Verify the STRATA TX System is connected and powered up. See "Powering the STRATA TX System" on page 3-12.

2. Observe the Main screen is displayed. See Figure 3-30.

Figure 3-30: Main Screen (Typical) - Power Output

```
Preset 3
□.□ □ W
```
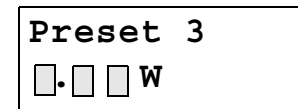
3. Turn the control switch ccw until the display reads **Set PowerOut**. See Figure 3-31.

Figure 3-31: Change Power Output (Typical)

```
Set PowerOut

Attn: □dB
```
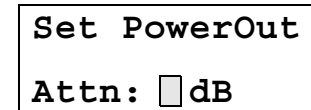
| Notes | Changing power output attenuation when the TX System is in the transmit mode will place the transmitter in the standby mode when the control switch is pressed.

Output power attenuation level must be reset or verified whenever Presets are changed . |
|-------|---|

4. Press the control switch once and observe the **ATTN: dB** line begins to blink.

5. Turn the control switch cw or ccw until the desired attenuation level is displayed.

6. Press the control switch to select the power output attenuation level.

7. Observe the new attenuation level is displayed.

8. After a short delay, observe the Main screen is displayed.

9. Press the control switch for one second to place the TX System in the transmit mode, as required.

3.6.4   Controlling TCU to TXU DC Power on Coax

If your STRATA TX System requires the TXU and TCU to be mounted in separate locations, MRC recommends powering the TCU via the coaxial cable from the TXU.

Note   When the TCU and TXU are mounted in separate locations, it is recommended that DC input power be connected to the TXU.

Since either unit may be powered from the other unit via DC power superimposed on the coaxial cable between the units, DC input power may therefore be applied to either the TXU or the TCU.

If your TXU and TCU configurations contain **DC ON COAX** switches mounted on the units, these switches must be set to **ON** in addition to controlling DC power superimposed on the coaxial cable from the TXU to the TCU or from the TCU to the TXU.

To apply DC power from the TXU to the TCU superimposed on the coaxial cable between the two units, perform the following steps.

Notes   This procedure must only be performed on STRATA TX Systems where the TXU and TCU are physically mounted in separate locations.

This procedure may be performed using either the TXU or TCU control switch and display.

Apply DC Power on Coax

1. Verify the STRATA TX System is connected and powered up. See "Powering the STRATA TX System" on page 3-12.
2. Observe the Main screen is displayed. See Figure 3-32.

Figure 3-32: Main Screen
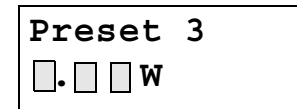
```
Preset 3
□.□□W
```

Note   If your TCU does not contain a **DC ON COAX** switch, go to step 4.

3. Turn the recessed **DC ON COAX** switch on the front panel of the TCU until the screw slot points to **OFF**.
4. Turn the recessed **DC ON COAX** switch on the front panel of the TXU until the screw slot points to **OFF**.
5. Turn the control switch ccw until the display reads **75 Ohm Coax**.   See Figure 3-33.

Figure 3-33: 75 Ohm Coax

```
┌─────────────────────────┐
│  75 Ohm Coax            │
│                         │
│  Power Off              │
└─────────────────────────┘
```

Note   Pressing the control switch to select application of DC power on the coaxial cable from the TXU to the TCU or from the TCU to the TXU when the TX System is in the transmit mode will place the transmitter in the standby mode.

6.   Press the control switch one time to change **Power Off** to **Power On**.

7.   After a short delay, observe the Main screen is displayed.

8.   Press the control switch for one second to place the TX System in the transmit mode, as required.

Remove DC Power on Coax

Note   This procedure may be performed using either the TXU or TCU control switch and display.

1.   Observe the Main Screen is displayed.

2.   Turn the control switch ccw until the display reads **75 Ohm Coax**.

3.   Press the control switch one time to change the display from **Power On** to **Power Off**.

4.   After a short delay, observe the Main screen is displayed.
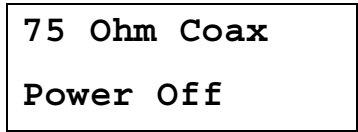
Note   If your TCU does not contain a **DC ON COAX** switch, go to step 6.

5.   Turn the recessed **DC ON COAX** switch on the front panel of the TCU until the screw slot points to **ON**.

6.   Turn the recessed **DC ON COAX** switch on the front panel of the TXU until the screw slot points to **ON**.

3.7 Front Panel vs. STRATA TX Configurator Settings

The design of the STRATA TX System and STRATA TX Configuration Utility software makes commonly available settings accessible from the TXU and/or TCU front panel and more advanced settings accessible through the STRATA TX Configuration Utility.

A summary of settings that can be controlled by each method is shown in Table 3-1.

Table 3-1: Front Panel vs. Configurator Settings

Parameter	Available Settings	Set Using Control Switch	Set Using TX Configurator
Presets			
Preset in use	1, 2,... 9	✔	✔
Preset text	Any 12 alphanumeric characters		✔
Operation Mode	• MPEG IF Out		✔
	• MPEG ASI Out		✔
	• COFDM-ASI In		✔
	• Ext IF In		✔
	• Analog IF Out		✔
	• DVB-Satellite		✔

Table 3-1: Front Panel vs. Configurator Settings (Continued)

Parameter	Available Settings	Set Using Control Switch	Set Using TX Configurator
Color Bars	• PAL		✔
	• NTSC		✔
	• OFF		✔
	• Auto		✔
IF CW Tone	• ON		✔
	• OFF		✔
Channels			
Channel & Offset in use	• 1 thru 10	✔	
	• -, Center, +	✔	
Channel & Offset frequencies	Depends on band		✔
DC Power			
DC On Coax (75 Ohm Coax)	• Power Off	✔	
	• Power On	✔	
COFDM			
COFDM Bandwidth	• 6 MHz		✔
	• 7 MHz		✔
	• 8 MHz		✔
COFDM Modulation (MPEG IF Out and COFDM-ASI In Modes)	• QSPK		✔
	• 16 QAM		✔
	• 64 QAM		✔

Table 3-1: Front Panel vs. Configurator Settings (Continued)

Parameter	Available Settings	Set Using Control Switch	Set Using TX Configurator
COFDM Guard Interval	• 1/32		✔
	• 1/16		✔
	• 1/8		✔
	• 1/4		✔
MPEG			
Audio A Type	• OFF		✔
	• MPEG		✔
	• Linear		✔
Audio B Type	• OFF		✔
	• MPEG		✔
	• Linear		✔
Audio A Mode	• Stereo		✔
	• Dual Mono		✔
Audio B Mode	• Stereo		✔
	• Dual Mono		✔
Audio A Input	• Test Tone		✔
	• Analog		✔
	• SDI EMB		✔
	• AES EBU		✔

Table 3-1: Front Panel vs. Configurator Settings (Continued)

Parameter	Available Settings	Set Using Control Switch	Set Using TX Configurator
Audio B Input	• Test Tone		✔
	• Analog		✔
	• SDI EMB		✔
	• AES EBU		✔
BISS	• OFF		✔
	• BISS-1		✔
	• BISS-E		✔
Video Input	• SDI 625 In		✔
	• PAL In		✔
	• PAL M In		✔
	• PAL N In		✔
Chroma Format	• 4:2:0		✔
	• 4:2:2		✔
Delay Mode	• Standard		✔
	• Low		✔
Wayside Channel State	• OFF		✔
	• IRD Compatible		✔
	• STRATA Compatible		✔
FMT			
Video Deviation	• 3 MHz		✔
	• 4 MHz		✔

Table 3-1: Front Panel vs. Configurator Settings (Continued)

Parameter	Available Settings	Set Using Control Switch	Set Using TX Configurator
Audio Channel 1 thru 4 Frequency	• 4830 kHz		✔
	• 5200 kHz		✔
	• 5800 kHz		✔
	• 6200 kHz		✔
	• 6800 kHz		✔
	• 7020 kHz		✔
	• 7500 kHz		✔
	• 8065 kHz		✔
	• 8300 kHz		✔
	• 8590 kHz		✔
Audio Channel Frequency Enabled	• Selected		✔
	• Not selected		✔
Pre-emphasis	• Selected		✔
	• Not selected		✔
DVB-Satellite			
Modulation	• QSPK		✔
	• 16 QAM		✔
	• 8 PSK		✔
Symbol Rate	• (Variable)		✔

Parameter	Available Settings	Set Using Control Switch	Set Using TX Configurator
Forward Error Correction	• 1/2		✔
	• 2/3		✔
	• 3/4		✔
	• 5/6		✔
	• 7/8		✔
Roll Off Factor	• 0.25		✔
	• 0.35		✔
IF Frequency	• (Variable)		✔

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4 *Troubleshooting*

4.1 Chapter Overview

This chapter describes how to troubleshoot your STRATA TX System.

Here are the topics covered:

4.2 Status LED

Above the **PWR** switch on both the TXU and TCU is a multi-color Status LED. The LED indications are listed in Table 4-1.

Table 4-1: Status LED Indications

LED Color	Meaning	Suggested Action
-----	Power is not on in that unit.	Turn on power, as required.
Green	Power is on and no errors are detected.	None.
Amber	**Minor Alarm** - Power is on but some part of the system reports an abnormal condition that requires attention. Condition might impair performance.	Check Monitor Screens for error messages or Error Codes. Troubleshoot using tables in this chapter.
Red	**Major Alarm** - Power is on but there is a serious failure or error that will prevent normal operation. The internal processors are not running.	*Turn off unit and disconnect power.*

WARNING   A **Major Alarm** may also indicate a potential safety hazard. Shut down the STRATA TX System and disconnect power.

4.3 Messages on Display

One of the ways the STRATA TX System will alert you to problems is by error messages on the TXU and/or TCU front panel displays. These are displayed on the Monitor Screens.

See Table 4-2 on page 4-2 for descriptions of the messages and what to do when they appear.

Table 4-2: Display Messages

Message	Meaning	Suggested Operator Action	Suggested Technical Staff Action
Not On Chnl	Channel frequencies defined in the Channel Plan for that band are not being recognized.	Contact technical staff.	• Use STRATA TX Configuration Utility to check settings. Check the Channel Plan to be sure it is correct. Verify Channel Plan matches the transmitter settings. • If message persists even when operating on a frequency that matches the channel plan, unit may have suffered internal failure. Call MRC Technical Support.
No Video	The TX is unable to lock on video signal.	• Check cable connection between antenna and TX System. • Check cable connection between TXU and TCU. • Contact technical staff.	• Use STRATA TX Configuration Utility to check settings. • If message persists, unit may have suffered internal failure. Call MRC Technical Support.

4.4   Error Codes

The STRATA TX has an extensive library of diagnostic Error Codes to help you pinpoint any problems.

These Error Codes:

- Are displayed on the front panel display, on the Error Code Screen.

- Cause the Status LED to glow amber, alerting you to investigate the problem.

The Error Codes are formatted into 2 groups of characters, as described in Figure 4-1.

4.4.1   Primary Error Code

The first group of characters is the Primary Error Code. In most cases this portion of the Error Code will uniquely identify the problem.

See Table 4-3 on page 4-4 for descriptions of the error codes and what to do when they appear.

Figure 4-1: Error Code Format
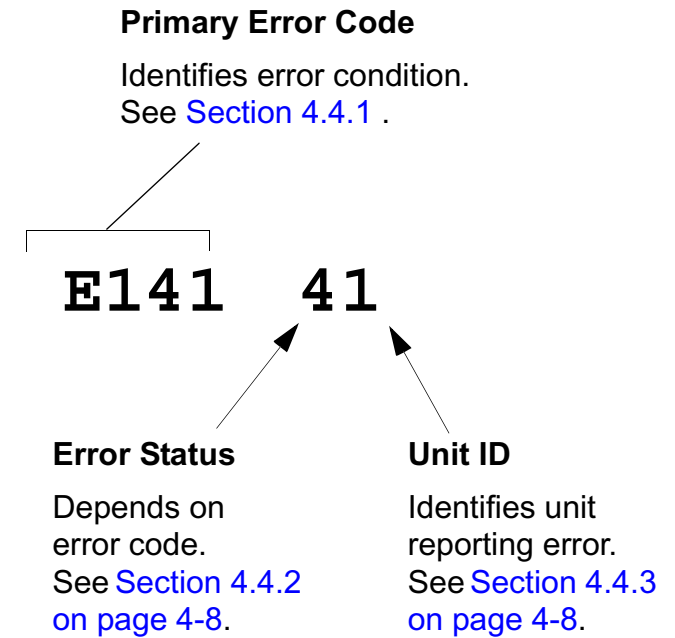
Primary Error Code

Identifies error condition.
See Section 4.4.1 .

E141 41

Error Status

Depends on error code.
See Section 4.4.2 on page 4-8.

Unit ID

Identifies unit reporting error.
See Section 4.4.3 on page 4-8.

Table 4-3: Primary Error Codes

Error Code	Meaning	Suggested Operator Action	Suggested Technical Staff Action
Status Errors *(Some part of System is reporting an abnormal condition.)*			
E020	TXU IF Fault	• Verify condition of all cable connections. • Contact technical staff.	Call MRC Technical Support.
E021	TXU RF Fault	• Verify condition of all cable connections. • Contact technical staff.	Call MRC Technical Support.
E0E0	FMT Video PLL Unlocked	*Note - This error will appear only if the TX System contains the FMT option.* • Contact technical staff.	• Verify video input is at the correct level. • Call MRC Technical Support.
E0E1	FMT Audio 1 PLL Unlocked	*Note - These errors will appear only if the TX System contains the FMT option.* • Check FMT settings using Monitor Screens and Command Screens. Settings must match transmitter settings. • Contact technical staff.	• Use STRATA TX Configuration Utility to check FMT settings. Be sure all settings match the transmitter settings. • Use STRATA TX Configuration Utility to reprogram all the settings in the radio. • If problem persists, possible hardware failure. Call MRC Technical Support.
E0E2	FMT Audio 2 PLL Unlocked		
E0E3	FMT Audio 3 PLL Unlocked		
E0E4	FMT Audio 4 PLL Unlocked		

Table 4-3: Primary Error Codes (Continued)

Error Code	Meaning	Suggested Operator Action	Suggested Technical Staff Action
E080	Communication Failure with the COFDM/MPEG Unit	*Note - This error will appear only if the TX System contains the COFDM/MPEG option.* • If the TX System contains a standalone TXU or TCU, contact technical staff. • If the TX System contains both a TXU and a TCU, verify condition of cable connections. Contact technical staff.	If problem persists, possible hardware failure. Call MRC Technical Support.
Parameter Errors *(Some internal parameter is outside of allowable limits.)*			
E030	TXU 2.048 Volt Reference Error	• Check for Error Codes related to power - E035 thru E039 and E03A thru E03E. Correct power problem. • Contact technical staff.	If errors persist with correct power connected, unit has suffered internal failure. Call MRC Technical Support.
E031	TXU 5.5 Volt Reference Error		
E032	TXU 7 Volt Line Error		
E033	TXU 11 Volt Line Error		
E034	TXU Temperature Error	*Note - TXU internal fans operate only when TX System is transmitting. Fan operation can be determined by listening for audible fan noise or by feeling for airflow at rear of TXU when TX System is in transmit mode.* • Verify TXU internal fans are operating when TX System is transmitting. • Check TXU to be sure it is not too close to sources of heat. Relocate TXU, if possible. • Verify TXU has room around it for air circulation. Move objects preventing air flow. • Contact technical staff.	If errors persist with proper location and airflow and correct power is connected, unit has suffered internal failure. Call MRC Technical Support.

Table 4-3: Primary Error Codes (Continued)

Error Code	Meaning	Suggested Operator Action	Suggested Technical Staff Action
E035	TXU 75 Ohm Coax Current Error	*Note - these errors can only appear in a TX System with TXU and a TCU, when powering the TXU from the TCU or from the TCU to the TXU via DC power superimposed on the coax cable between the TCU and the TXU.* • Check connection of coax cable between TCU and TXU. Verify connectors are fully mated and verify cable and connectors are undamaged. • Make sure all power cables are connected properly. • Contact technical staff.	If errors persist with correct coax connections and correct power connected, unit has suffered internal failure. Call MRC Technical Support.
E036	TXU 75 Ohm Coax Voltage error		
E037	TXU 75 Ohm Coax Power Error		
E038	TXU 50 Ohm Coax Current Error		
E039	TXU 50 Ohm Coax Voltage error		
E03A	TXU 50 Ohm Coax Power Error		
E03B	TXU Circular Connector Current Error	• Verify all power cables are properly connected and are not damaged. • Verify correct DC input power is being applied to the TXU. • Contact technical staff.	If errors persist with correct power connected, unit has suffered internal failure. Call MRC Technical Support.
E03C	TXU Circular Connector Voltage Error		
E03D	TXU Circular Connector Power Error		
E03E	TXU DC Bus Error	• Contact technical staff.	Call MRC Technical Support.
E040	TCU 2.048 Volt Reference Error	• Check for error codes related to power - E043 thru E048. Correct power problem • Contact technical staff.	If errors persist with correct power connected, unit has suffered internal failure. Call MRC Technical Support.
E041	TCU 5.5 Volt Reference Error		

Table 4-3: Primary Error Codes (Continued)

Error Code	Meaning	Suggested Operator Action	Suggested Technical Staff Action
E042	TCU Temperature error	• Check TCU to be sure it is not too close to sources of heat. Relocate TCU, if possible. • Verify TCU has room around it for air circulation. Move objects preventing air flow. • Contact technical staff.	If errors persist with proper location and airflow and correct power is connected, unit has suffered internal failure. Call MRC Technical Support.
E043	TCU 75 Ohm Coax Current Error	*Note - these errors can only appear in a TX System with TXU and a TCU, when powering the TXU from the TCU or from the TCU to the TXU via DC power superimposed on the coax cable between the TCU and the TXU.* • Check connection of coax cable between TCU and TXU. Verify connectors are fully mated and verify cable and connectors are undamaged. • Make sure all power cables are connected properly. • Contact technical staff.	If errors persist with correct coax connections and correct power connected, unit has suffered internal failure. Call MRC Technical Support.
E044	TCU 75 Ohm Coax Voltage Error		
E045	TCU 75 Ohm Coax Power Error		
E046	TCU Circular Connector Current Error	• Make sure all power cables are connected properly and are not damaged. • Verify correct DC input power is being applied to the TCU. • Contact technical staff.	If errors persist with correct power connected, unit has suffered internal failure. Call MRC Technical Support.
E047	TCU Circular Connector Voltage Error		
E048	TCU Circular Connector Power Error		
E049	TCU DC Bus Error	Contact technical staff.	Call MRC Technical Support.

4.4.2   Error Status

The significance of the Error Status digit depends on what Primary Error Code is being reported. See Table 4-4.

Table 4-4: Error Status Digit

Status Digit	Meaning
Status Error (Error Codes E0E0 thru E0E4, E020, E021, and E080)	
8	There is an error.
Parameter Error (Error Codes E030 thru E039, E03A thru E03E, and E042 thru E049, E060 thru E069, and E06A)	
4	Value is too low.
8	Value is too high.

4.4.3   Unit ID

The Unit ID digit identifies which part of the STRATA TX System is reporting a problem. See Table 4-5.

Table 4-5: STRATA Unit ID Digit

Unit ID	
1	Transmitter Unit (TXU)
2	Transmitter Control Unit (TCU)

4.5   Operational Problems

Information provided on the following pages will assist you in troubleshooting problems that arise in the operation of your STRATA TX System.

For video problems, See Table 4-6 on page 4-9; for general system problems, See Table 4-7 on page 4-10.

Table 4-6: Video Problems

Problem	Possible Cause	Suggested Operator Action	Suggested Technical Staff Action
Video Problems			
No video.	Problem with video source or cabling	• Check video source and cabling. • Contact technical staff.	• Check video source and cabling. • Call MRC Technical Support.
	Transmitter and Receiver compatibility problems	• Verify Transmitter and Receiver are both operating in the same digital or analog modes. • Verify Transmitter and Receiver are both operating on the same frequency. If frequency offsets are used, verify offsets are identical between Transmitter and Receiver. • Contact technical staff.	• Call MRC Technical Support
	Video source configuration problem	• Verify TXU/TCU front panel settings match video source inputs. • Contact technical staff.	• Verify video inputs match STRATA TX Configuration Utility settings. • Call MRC Technical Support.

Table 4-7: General System Problems

Problem	Possible Cause	Suggested Operator Action	Suggested Technical Staff Action
General System Problems			
Status LED on TXU/ TCU is yellow.	TX System is indicating a **Minor Alarm**.	• Check all Monitor Screens on TXU/TCU display. Troubleshoot per Section 4.3 on page 4-1. • Check Error Code Screen on TXU/TCU display. Troubleshoot per Section 4.4 on page 4-3.	• Error messages: Troubleshoot per Section 4.3 on page 4-1. • Error Codes: Troubleshoot per Section 4.4 on page 4-3.
Status LED on TXU or TCU is red.	TX is indicating a **Major Alarm**.	**TURN OFF POWER and call for service.**	Call MRC Technical Support.
Changing settings on one unit doesn't change settings on the other in a connected TXU and TCU system.	TXU and TCU are not communicating.	• Check connection between TXU and TCU. • Turn power off in both TXU and TCU. Then turn power on in both TXU and TCU.	If problem persists with correct coax connections, one or both units have suffered internal failure. Call MRC Technical Support.

A   *Channels & Frequencies*

A.1   Appendix Overview

This Appendix presents the channels and frequencies that can be programmed into your STRATA TX System at the factory.

Here are the topics covered:

A.2   Initial Factory Presets

This section lists the channels and frequencies for each RF band covered by the STRATA TX System. These frequencies are preset at the factory, but can be modified using the STRATA TX Configurator software.

> **Note**   These frequency settings should only be changed by qualified technical personnel.

Contact the Society of Broadcast Engineers (SBE) coordinator for up-to-date information on local frequency plans for Electronic News Gathering (ENG) and Remote Pickup (RPU) operations.

A.2.1   3.4 to 3.8 GHz Channel Plan

The channel plan for the 3.4 to 3.8 GHz STRATA TX System is contained in Table A-1.

Table A-1: 3.4 to 3.8 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	3406.250	3418.250	3431.250
2	3443.250	3455.250	3467.250
3	3480.250	3492.250	3504.250
4	3506.250	3518.750	3531.250
5	3543.750	3556.250	3568.750
6	3581.250	3593.750	3606.250
7	3610.000	3620.000	3630.000
8	3640.000	3650.000	3660.000
9	3670.000	3680.000	3690.000
10	3700.000	3710.000	3720.000
11	3730.000	3740.000	3750.000

Table A-1: 3.4 to 3.8 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
12	3760.000	3770.000	3780.000
13	3790.000	3800.000	3800.000
14	3800.000	3800.000	3800.000

A.2.2   4.4 to 5.0 GHz Channel Plan

The channel plan for the 4.4 to 5.0 GHz STRATA TX System is contained in Table A-2.

Table A-2: 4.4 to 5.0 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	4450.000	4475.000	4500.000
2	4525.000	4550.000	4575.000
3	4600.000	4625.000	4650.000
4	4675.000	4700.000	4725.000
5	4750.000	4775.000	4800.000
6	4825.000	4850.000	4875.000
7	4900.000	4925.000	4925.000
8	4940.500	4941.500	4942.500
9	4943.500	4944.500	4944.500
10	4947.500	4952.000	4957.500
11	4962.500	4967.500	4972.500
12	4977.500	4982.500	4982.500
13	4985.500	4986.500	4987.500
14	4988.500	4989.500	4989.500

A.2.3   6.4 to 7.1 GHz Channel Plan

The channel plan for the 6.4 to 7.1 GHz STRATA TX System is contained in Table A-3.

Table A-3: 6.4 to 7.1 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	6881.250	6887.500	6893.750
2	6906.250	6912.500	6918.750
3	6931.250	6937.500	6943.750
4	6956.250	6962.500	6968.750
5	6981.250	6987.500	6993.750
6	7006.250	7012.500	7018.750
7	7031.250	7037.500	7043.750
8	7056.250	7062.500	7068.750
9	7081.250	7087.500	7093.750
10	7106.250	7112.500	7118.750
11	6431.250	6437.500	6443.750
12	6456.250	6462.500	6468.750
13	6481.250	6487.500	6493.750
14	65.6.250	6512.500	6518.750

A.2.4 6.9 to 7.5 GHz Channel Plan

The channel plan for the 6.9 to 7.5 GHz STRATA TX System is contained in Table A-4.

Table A-4: 6.9 to 7.5 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	6900.000	6915.000	6930.250
2	6945.250	6960.000	6975.750
3	6990.250	7005.000	7020.750
4	7035.250	7050.000	7065.750
5	7080.250	7095.000	7110.750
6	7125.250	7140.000	7155.750
7	7170.250	7185.000	7200.750
8	7215.250	7230.000	7245.750
9	7260.250	7275.000	7290.750
10	7305.250	7320.000	7335.750
11	7350.250	7365.000	7380.750
12	7395.250	7410.000	7425.750
13	7440.250	7455.000	7470.750
14	7485.250	7500.000	7500.000

A.2.5 7.4 to 8.0 GHz Channel Plan

The channel plan for the 7.4 to 8.0 GHz STRATA TX System is contained in Table A-5.

Table A-5: 7.4 to 8.0 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	7405.000	7425.000	7445.000
2	7455.000	7475.000	7495.000
3	7505.000	7525.000	7545.000
4	7555.000	7575.000	7595.000
5	7605.000	7625.000	7645.000
6	7655.000	7675.000	7695.000
7	7705.000	7725.000	7745.000
8	7755.000	7775.000	7795.000
9	7805.000	7825.000	7845.000
10	7855.000	7875.000	7895.000
11	7905.000	7925.000	7945.000
12	7955.000	7975.000	7995.000
13	8005.000	8025.000	8045.000
14	8055.000	8075.000	7085.000

A.2.6   7.8 to 8.5 GHz Channel Plan

The channel plan for the 7.8 to 8.5 GHz STRATA TX System is contained in Table A-6.

Table A-6: 7.8 to 8.5 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	7805.000	7825.000	7845.000
2	7855.000	7875.000	7895.000
3	7905.000	7925.000	7945.000
4	7955.000	7975.000	7995.000
5	8005.000	8025.000	8045.000
6	8055.000	8075.000	8095.000
7	8105.000	8125.000	8145.000
8	8155.000	8175.000	8195.000
9	8205.000	8225.000	8245.000
10	8255.000	8275.000	8295.000
11	8305.000	8325.000	8345.000
12	8355.000	8375.000	8395.000
13	8405.000	8425.000	8445.000
14	8455.000	8475.000	8495.000

A.2.7   8.2 to 8.9 GHz Channel Plan

The channel plan for the 8.2 to 8.9 GHz STRATA TX System is contained in Table A-7.

Table A-7: 8.2 to 8.9 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	8205.000	8225.000	8245.000
2	8255.000	8275.000	8295.000
3	8305.000	8325.000	8345.000
4	8355.000	8375.000	8395.000
5	8405.000	8425.000	8445.000
6	8455.000	8475.000	8495.000
7	8505.000	8525.000	8545.000
8	8555.000	8575.000	8595.000
9	8605.000	8625.000	8645.000
10	8655.000	8675.000	8695.000
11	8705.000	8725.000	8745.000
12	8755.000	8775.000	8795.000
13	8805.000	8825.000	8845.000
14	8855.000	8875.000	8895.000

A.2.8   10.0 to 10.7 GHz Channel Plan

The channel plan for the 10.0 to 10.7 GHz STRATA TX System is contained in Table A-8.

Table A-8: 10.0 to 10.7 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	10005.000	10025.000	10045.000
2	10055.000	10075.000	10095.000
3	10105.000	10125.000	10145.000
4	10155.000	10175.000	10195.000
5	10205.000	10225.000	10245.000
6	10255.000	10275.000	10295.000
7	10305.000	10325.000	10345.000
8	10355.000	10375.000	10395.000
9	10405.000	10425.000	10445.000
10	10455.000	10475.000	10495.000
11	10505.000	10525.000	10545.000
12	10555.000	10575.000	10595.000
13	10605.000	10625.000	10645.000
14	10655.000	10675.000	10695.000

A.2.9   10.5 to 11.2 GHz Channel Plan

The channel plan for the 10.4 to 11.2 GHz STRATA TX System is contained in Table A-9.

Table A-9: 10.5 to 11.2 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	10505.000	10525.000	10545.000
2	10555.000	10575.000	10595.000
3	10605.000	10625.000	10645.000
4	10655.000	10675.000	10695.000
5	10705.000	10725.000	10745.000
6	10755.000	10775.000	10795.000
7	10805.000	10825.000	10845.000
8	10855.000	10875.000	10895.000
9	10905.000	10925.000	10945.000
10	10955.000	10975.000	10995.000
11	11005.000	11025.000	11045.000
12	11055.000	11075.000	11095.000
13	11105.000	11125.000	11145.000
14	11155.000	11175.000	11195.000

A.2.10   10.8 to 11.5 GHz Channel Plan

The channel plan for the 10.8 to 11.5 GHz STRATA TX System is contained in Table A-10.

Table A-10: 10.8 to 11.5 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	10805.000	10825.000	10845.000
2	10855.000	10875.000	10895.000
3	10905.000	10925.000	10945.000
4	10955.000	10975.000	10995.000
5	11005.000	11025.000	11045.000
6	11055.000	11075.000	11095.000
7	11105.000	11125.000	11145.000
8	11155.000	11175.000	11195.000
9	11205.000	11225.000	11245.000
10	11255.000	11275.000	11295.000
11	11305.000	11325.000	11345.000
12	11355.000	11375.000	11395.000
13	11405.000	11425.000	11445.000
14	11455.000	11475.000	11495.000

A.2.11   12.7 to 13.25 GHz Channel Plan

The channel plan for the 12.7 to 13.25 GHz STRATA TX System is contained in Table A-11.

Table A-11: 12.7 to 13.25 GHz Channel Plan

Channel	(-) Offset (MHz)	(0) Center (MHz)	(+) Offset (MHz)
1	12706.250	12712.500	12718.750
2	12731.250	12737.500	12743.750
3	12756.250	12762.500	12768.750
4	12781.250	12787.500	12793.750
5	12806.250	12812.500	12818.750
6	12831.250	12837.500	12843.750
7	12856.250	12862.500	12868.750
8	12881.250	12887.500	12893.750
9	12906.250	12912.500	12918.750
10	12931.250	12937.500	12943.750
11	12956.250	12962.500	12968.750
12	12981.250	12987.500	12993.750
13	13006.250	13012.500	13018.750
14	13031.250	03037.500	03043.750
15	13056.250	13062.500	13068.750
16	13081.250	13087.500	13093.750
17	13106.250	13112.500	13118.750
18	13131.250	13137.500	13143.750
19	13156.250	13162.500	13168.750
20	13181.250	13187.500	13193.750
21	13206.250	13212.500	13218.750
22	13231.250	13237.500	13243.750

B   *Glossary*

This section describes acronyms and abbreviations used in communications, broadcasting, and in our products and documentation.

Table B-1: Useful Terms

1RU	1 Rack Unit
16 QAM	16-state Quadrature Amplitude Modulation The signal (video + audio) is imposed onto the 70 MHz carrier by varying both the phase and the amplitude of the signal while keeping the frequency constant. There are 16 possible combinations of phase and amplitude that can be used to carry information.
3RU	3 Rack Unit
32QAM	32-state Quadrature Amplitude Modulation The signal (video + audio) is imposed onto the 70 MHz carrier by varying both the phase and the amplitude of the signal while keeping the frequency constant. There are 32 possible combinations of phase and amplitude that can be used to carry information.
4 FSK	4-state Frequency Shift Keying
8 PSK	8-Phase Shift Keying

8QAM	8-state Quadrature Amplitude Modulation The signal (video + audio) is imposed onto the 70 MHz carrier by varying both the phase and the amplitude of the signal while keeping the frequency constant. There are 8 possible combinations of phase and amplitude that can be used to carry information.
64 QAM	64-state Quadrature Amplitude Modulation The signal (video+audio) is imposed onto the 70 MHz carrier by varying both the phase and the amplitude of the signal while keeping the frequency constant. There are 64 possible combinations of phase and amplitude that can be used to carry information.
A & C	Alarm and Control
ACU	AC to DC Converter Unit
ADPCM	Adaptive Differential Pulse Code Modulation
AES	Audio Engineering Society
AES/EBU	Unofficial name for a digital audio standard developed as a joint enterprise of the AES and the EBU.
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AIS	Alarm Indication Signal (all one's)
AMI	Alternate Mark Inversion, line code format for traffic data.
AVG	Average

Table B-1: Useful Terms (Continued)

ASI	Asynchronous Serial Interface A serial communications interface operating at 270 Mbit/sec., generally used in field news-gathering operations.
ASYNC	Asynchronous Digital communication in which there is no timing requirement for transmission and in which the start of each character is individually signaled by the transmitting device.
Baseband	A composite signal in which video and audio signals are combined together, with video occupying approximately 0-4.5 MHz and audio modulated onto subcarriers in the 5-6 MHz range. Also called Composite.
BB	Baseband
BDC	Block Down Converter
BER	Bit Error Ratio The ratio of bits containing errors to the total number of bits in the signal, over a time period.
BiasT	A type of interconnection between the IDU and the ODU. In Bias T wiring, IF and DC are combined and carried on the coax cable up the ODU; blocking circuitry prevents the DC from entering the IDU.
BISS	Basic Interoperable Scrambling System A means of encrypting and decrypting a digital signal to prevent unauthorized reception. The encryption and decryption are controlled by a digital key, which is shared at both the transmitting and receiving location.

Table B-1: Useful Terms (Continued)

BISS-1	BISS encryption that uses a fixed key.
BISS-E	BISS encryption that uses an encrypted key.
BNC	Bayonet lock coaxial connector
BPF	Band Pass Filter
bps or b/sec	Bits per second
BPSK	Binary Phase Shift Keying
BW	Bandwidth
CCITT	International Telegraph and Telephone Consultative Committee A telecommunications standardizing committee of the ITU.
CCPS	Command & Control Power Supply
CENELEC	European Committee for Electrotechnical Standardization
CNR	Carrier-to-Noise Ratio
COFDM	Coded Orthogonal Frequency Division Multiplexing
Composite (Baseband)	A band or grouping of frequencies and/or subcarriers, including video, occupied by the signal in a radio transmission system. Also called Baseband.
CR4	Code Runner 4
CSI	Channel-State Information
CV	Composite Video Video signal in which the chrominance (color) and luminance (brightness) information are combined in one signal. S-Video separates the chrominance and luminance into individual signals.
CW	Carrier Wave
DAB	Digital Audio Broadcasting

dB	Decibel A logarithmic measurement of power or voltage, applied to audio and RF signals.
dBm	A unit of measurement referenced to one milliwatt.
DCC	Distribution Command and Control
DCE	Data Communications Equipment A device that communicates with a DTE device. In practical terms, the DCE is usually a modem and the DTE device is usually a computer.
De-emphasis	Reducing the amplitude of high frequency components of an analog audio signal. Done on the receive end of an analog link to take out Emphasis added on the transmit side.
DFT	Discrete Fourier Transform
DMUX, DEMUX	Demultiplexer
DQPSK	Differential Quadrature (Quaternary) Phase-Shift Keying
DRL	Data Return Link
DS3	Digital Signal 3 44.736 Mbps data rate.
DTE	Data Terminal Equipment A device that communicates with a DCE device. In practical terms, the DTE is usually a computer and the DCE device is usually a modem.
Duplex	A channel capable of transmitting information simultaneously in both directions.
DVB	Digital Video Broadcasting

DVB-ASI	Digital Video Broadcasting - Asynchronous Serial Interface A widely-used MPEG-2 digital transport interface. Physically the connection is made either with optical fiber or 75 ohm coax with a BNC connector. Interface can support data rates up to 270 Mb/sec.
DVB-C	Digital Video Broadcasting - Cable
DVB-S	Digital Video Broadcasting - Satellite
DVB-T	Digital Video Broadcasting - Terrestrial
E1	2.048 Mbps data rate.
E3	34.368 Mbps data rate
EIA	Electronic Industries Association An industry association that establishes various standards.
EBU	European Broadcasting Union In addition to other activities, EBU produces technical statements and recommendations for PAL television systems.
EMC	Electromagnetic compatibility.
Emphasis	Boosting the amplitude of high frequency components of an analog audio signal. Done on the transmit side of an analog link to improve signal-to-noise ratio.
ENG	Electronic News Gathering
ERRS	Errors
ESD	Electrostatic Discharge
ET	Eastern Time (US)
ETSI	European Telecommunications Standards Institute

Table B-1: Useful Terms (Continued)

EVM	Error Vector Magnitude
FCC	Federal Communications Commission The United State's communications regulatory agency.
FDM	Frequency Division Multiplexing
FEC	Forward Error Corrections
FFT	Fast Fourier Transform
FIFO	First In, First Out buffer
FIR	Finite Impulse Response
FMT	FM Video Modulator or FM Transmitter
FPGA	Field Programmable Gate Array
FSK	Frequency-Shift Keying
FW	Firmware
GHz	Gigahertz (10^9 cycles per second)
GI	Guard Interval
GND	Ground
GUI	Graphic User Interface
HDB3	High Density Bipolar 3 line code format for traffic data.
HPF	High Pass Filter
HPU	High Power Unit
H/W or HW	Hardware
ICI	Inter-Carrier Interference
ICR	Inter-City Relay
ID	Identification
IDU	Indoor Unit
IF	Intermediate Frequency

Table B-1: Useful Terms (Continued)

IMD	Inter-Modulation Distortion
I/O	Input/Output
IRD	Integrated Receiver Decoder
IRE	1. Institute of Radio Engineers, an international professional radio engineering association that establishes various standards. 2. A unit of measurement, established by the IRE, in which 1 IRE Unit =.00714 volts peak-to-peak (Vp-p) and 140 IRE units equals 1 Vp-p.
ISI	Inter-Symbol Interference
ISO	International Standards Organization
kbps	Kilobits per second
kHz	Kilo (1,000) cycles per second
LAN	Local Area Network
LBO	Line Build Out
LCD	Liquid Crystal Display
Lcl	Local
LED	Light Emitting Diode
LIU	Line Interface Unit
LNA	Low Noise Amplifier
LNB	Low Noise Block Down Converter
LNC	Low Noise Converter
LO	Local Oscillator
LOS	Loss of Signal
LPF	Low Pass Filter
LQ	Link Quality
Mbps	Megabits per second
MHz	Million (1,000,000) cycles per second

MPEG	Moving Picture Experts Group
M-QAM	M-order of Quadrature Amplitude Modulation
MRC	Microwave Radio Communications
Multipath	An unpredictable set of reflections and/or direct waves, each with its own degree of attenuation and delay. Due to obstacles and reflectors in the wireless channel, transmitted signals arrive at the received from various directions over multiple paths.
MUX	Multiplexer
NC	Normally Closed (Relay or switch contacts)
N/C	No Connection
NICAM	Near-Instantaneous Companding and Multiplexing
NO	Normally Open (Relay or switch contacts)
NRZ	Non-Return-to-Zero (Modulation)
NTSC	National Television System Committee Color television standard used in the US. Provides 525 horizontal lines of resolution. Not compatible with PAL or SECAM.
Null modem cable	An RS-232 cable designed to connect two computers (or other data sources) together. It has male DB9 connectors on each end, to mate with the DB9 female connectors on the PCs. It also has the Transmit and Receive connections crossed over so Transmit (pin 3) on one end connects to Receive (pin 2) on the other. Also called "Crossover Cable".
ODU	Outdoor Unit
OFDM	Orthogonal Frequency Division Multiplexing
OOK	On-Off Keying

PAL	Phase Alteration Line Color television standard used in many European countries. Provides 625 horizontal lines of resolution. Not compatible with NTSC or SECAM.
PAL-M	Phase Alteration Line Color television standard used in many European countries. Provides 625 horizontal lines of resolution with 50 lines per field. Not compatible with NTSC or SECAM.
PAL-N	Phase Alteration Line Color television standard used in many European countries. Provides 525 horizontal lines of resolution with 60 lines per field. Not compatible with NTSC or SECAM.
PC	Personal Computer
PCR	Program Clock Reference
PER	Parity Error Rate
ØLK	Phase Lock
PID	Program Identification
PLL	Phase Lock Loop
PRBS	Pseudo Random Bit Sequence
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying The signal (video+audio) is imposed onto the 70 MHz carrier by varying the phase of the signal while keeping the amplitude and frequency constant. There are 4 possible values of phase that can be used to carry information.

RCL	Received Carrier Level The strength of a received RF signal, in dBm.
RCU	Receiver Control Unit
RCL	Received Carrier Level
Rcvr	Receiver
RD	Receive Data
RDS	Radio Data System
RF	Radio Frequency
RF Level	RF Power from the transmitter.
RFU	Radio Frequency Unit
RMA	Return Material Authorization
RPU	Remote Pickup
R-S	Reed-Solomon
RSSI	Receiver Signal Strength Indicator
RX	Receiver
RXU	Receiver Unit
RZ	Return to Zero
SBE	Society of Broadcast Engineers
SC	Service Channel
SC	Single Carrier
SCM	Single Carrier Modem
SD EMB	Synchronous Digital Interface Embedded
SDI	Synchronous Digital Interface A serial communications interface operating at 270 Mbit/sec. Generally used for in-studio news operations.

SECAM	Sequence de Couleur Avec Memoire Color television standard used in France, Russia, and other countries. Provides 625 horizontal lines of resolution. Not compatible with NTSC or PAL. Not supported by this product.
SER	Symbol Error Rate
Setpt	Set point
SFN	Single-Frequency Network

C *Specifications*

This section provides specifications for the STRATA 2 GHz Transmitter (TX) System.

Note	MRC reserves the right to make changes to specifications of products described in this specification sheet at any time without notice and without obligation to notify any person of such changes.

MPEG ENCODER SPECIFICATIONS:

SDI Input: . . . . ANSI/SMPTE 259M Level C
270Mb/s, 525/625 Component
2 Stereo Audio De-embedding provided AES/EBU

Composite Video: . . . . . . Composite (75 ohms)1 Vpp NTSC/PAL
BNC / Return Loss, Minimum 28 dB at 6MHz

Chroma/Level (Selectable): . . . . 4:2:2Profile @ Main Level
or 4:2:0 Profile @ Main Level

Frame Size: . . . . Horizontal Res. 720 pixels
Vertical Res: 480/525 NTSC, 576/625 PAL

Video Encoding Rate: . . . 2 to 30 Mbits Constant Bit Rate (4:2:2)
1.5 to 15 Mbits, Constant Bit Rate (4:2:0)
Latency (Selectable) – Bit Rate Dependent

Standard Mode: . . . . <200 ms / Low Delay Mode: <100 ms

VBI Processing: . . . . Extended Picture Mode (4:2:2)

Closed Caption: . . . . . . Supports line 21 (NTSC) CC EIA 608 std

Audio Coding: . . . . MPEG–II layer 2 (ISO/IEC 13818-3)
ISO/MPEG 11172.3 Layer II (MUSICAM)

Digital Audio Inputs (Configurable): . . .Supports AES/EBU audio
inputs (2 pairs) balanced inputs – 48 KHz sampling

Audio Channels (select): . . . . Analog audio (2 stereo pairs)
balanced, 600 ohm/600 ohms High Z (selectable)

Min. Audio Bit Rate: . . . . 192 Kbits/channel, 384 Kbits stereo
Lower audio bit rates down to 128 Kbits selectable

Audio Input Levels: . . . . +18 dBm clip level

Transport Stream Output: . . . . . . Fully DVB compliant DVB–ASI
per ISO/IEC 13818-2 (188 byte packets) continuous bit rate

Output Monitor Port - Front Panel Connector (70 MHz): . . . .
Encryption: . . . . BISS-1, BISS-E
Video input: . . . . NTSC/PAL, ASI

WAYSIDE CHANNEL:

Embedded data channel on MPEG Module (Uses the RS-232 port for DCE Data Path)

Data Rate: 1200, 2400, 4800, 9600, 19200, 38400

COFDM SPECIFICATIONS:

COFDM IF Output (Monitor): . . . . 70 MHz @ –5 dBm

COFDM Bandwidth (Selectable): . . . . 6 MHz, 7 MHz, 8 MHz

COFDM Carriers: . . . . DVB-T specifications 2K Carriers

Modulation Type: . . . . QPSK, 16QAM, 64QAM

FEC: 1/2, 2/3, 3/4, 5/6, 7/8

Guard Intervals (Selectable): 1/32, 1/16,1/8,1/4
70 MHz Carrier Insert Capability

ANALOG AUDIO & VIDEO MODULATOR:

Monitor Outputs: . . . . 70 MHz signal/pass thru

Level output/Impedance: . . . . +2 dBm Analog/75 Ohms

Signal Inputs: . . . . .Video, Composite
70 MHz (–10 dBm Analog)

Video Mute: . . . . 70 MHz test tone - auto

FM Deviation (Selectable): . . . . 3 MHz and 4 MHz - peak

Video Input/Return Loss: . . . . 1 Vpp (75 ohms)
525/625 line / > 26 dB

Plug in Video Filter Options: . . . . 4.2, 5.0, 5.5 MHz

Video Response: . . . . ± 0.25 dB@ or within video
filter bandwidth

VIDEO PERFORMANCE:

S/N: . . . . > 68 dB (weighted per RS-250C)

S/H: . . . . > 63 dB (weighted per RS-250C)

Diff. Phase / Gain: . . . . 1 degree / 1 %

Baseband Response: . . . . 10 KHz to 8 MHz
+0.5 dB / 8 MHz to 12 MHz <2 dB

Audio Channels: . . . . 4 Channel Analog
Line level: +8 dBm (600 ohms)

Subcarrier input tune range: . . . . 4.5 MHz to 8.59 MHz
Tunable in 2 KHz steps

AUDIO PERFORMANCE:

Frequency Response: . . . . (40 Hz - 15 KHz):±1.0 dB
(40 Hz - 10 KHz):±0.5 dB

THD: . . . . 0.5 % @ 1 KHz (75 KHz deviation)
2.0 % @ 1 KHz (200 KHz deviation)

Signal/Noise: . . . . 68 dBm (min.)

Output Impedance (select): . . . . 600 ohms bal./10K ohms

Output Level (adjust): . . . . +8 dBm - Line Level
nominal (0 dBm to +18 dBm)

Audio channel crosstalk: . . . . 60 dB

Emphasis: . . . . 50 μs/75 μs, flat - Factory set

Control Interface: . . . . 2 wire serial comm. port as DC input

FRONT PANEL CONTROLS:

Preset, Channel/Offset, TX Attenuation

DISPLAYS:

Analog (FMT): . . . . Preset. HPU Status, Frequency, Mode,
Audio, Channel Frequency, Video
Deviation, CW Tone, Error Report

Digital (MPEG/COFDM): . . . . . . Preset. HPU Status, Frequency,
Mode, Modulation, Bandwidth, FEC,
Guard Interval, Video Delay, Audio Mode,
CW Tone, Error Report, RF Power Out

CONFIGURATOR SOFTWARE MENUS:

(RS-232 connection to PC or laptop)

Main: . . . . Connect to Radio, Load Presets, Save
Presets, Select Module Options,
Program Radio, Upload Radio Settings

Radio: . . . . Operating Mode, Color Bars, CW
Tone, Transmitter Attenuation

COFDM: . . . . Modulation, FEC, Bandwidth, Guard Interval

MPEG: . . . . ASI Bit Rate, Wayside Baud Rate,
Chroma, Delay Mode, BISS Key/ID,
Audio Type, Audio Mode, Audio Input

FMT: . . . . Audio Channel Frequency (4),
Pre-Emphasis, Video Deviation

Channel Plan: . . . . Select Frequency +/– Offset, Clear Channel
Plan, Load Default FCC Plan, Load
Channel Plan, Save Channel Plan

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