User's Manual

COBHAM

The most important thing we build is trust.

DIGITAL REMOTE CONTROL UNIT

(RCU2000)

100-M0050X4
06/05/09

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REVISION HISTORY

Version	Date	Author	Comments
X3	01/16/2009	Ruzanna Manvelyan	Updated to new FW, Analog devices were removed

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1.0 Introduction

The GMS Digital RCU2000 is a versatile small remote control unit designed for use with variety of GMS DigitalTransmitters. It allows remote access to main features of these products over distances up to 100 feet through a simple three-wire (Belden 8723 with 35 pf/ft or smaller capacitance) RS-232 connection. The interface is a straightforward menu-driven, backlit LCD two-line display, featuring operating buttons that guide you through the various functions.
The RCU2000 can be factory configured to support any of the following GMS products:

SDMT Series Transmitters
MDT Series Transmitters
HDMT Series Transmitters

2.0 Preparation for Use

The RCU 2000 requires an external 8 - 32 Vdc power source. Ensure that supplied cable is attached to the Digital RCU and to the equipment to be controlled. The specified cables (see Appendix A and Appendix B) can control both SDMT and MDT Transmitter series. The Figure below shows the connections for Digital TX.

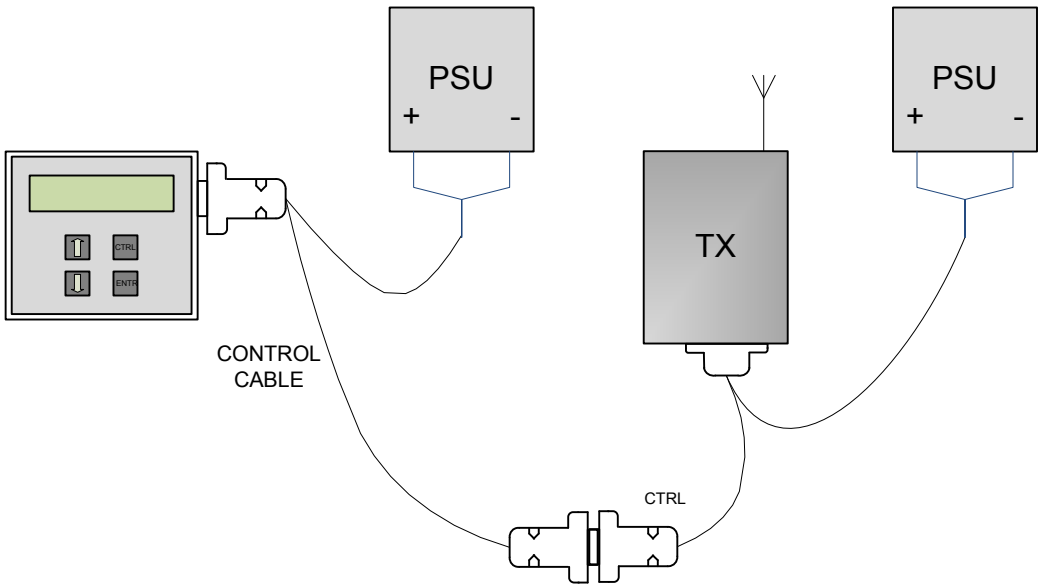
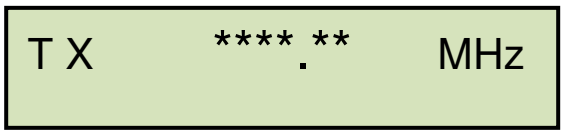


Figure 2.1 Digital TX

3.0 Initialization

When powered first, RCU screen displays the message GMS RCU and FW version number for a short time. TX initialization time is longer than RCU's. If the TX and RCU were powered simultaneously, RCU will displays message *Connecting TX*, then *TX is Initializing*. After TX initialization is compiled, the message changes to display the frequency of the controlled Transmitter:



NOTE: If the MDT unit power is turned off or the RS232 connector is removed, the RCU will not recognize that until Enter or CTRL button is pressed. Display will read "LOST TX COMM". After communication is reestablished, press the Enter key twice to bring RCU to initial screen.
If the connection is unsuccessful, the display indicates:

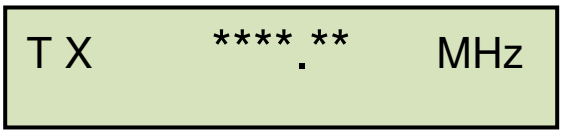
LOST TX COMMUN

4.0 Transmitter Operation, MAIN MENU

The RCU Main Menu operation is identical for both SDMT and MDT DIigital Transmitters series.The detailed flowchart of RCU functions is shown in Figure 4.1. The CTRL key selects the applicable transmitter control. For each press of the CTRL key the transmitter control functions are selected as shown below.

Current Frequency

In this mode the current frequency is displayed. When the UP ↑ or DOWN ↓ key is pressed, the transmitter frequency will change by 500 MHz step through. It will flash for a few seconds indicating that the new frequency is not written in the Transmitter. To make the change of frequency permanent, press the ENTER key. If the Enter key is not pressed, after 10 seconds the current frequency will be displayed.



UP ↑ Increment frequency
DOWN ↓ Decrement frequency
ENTER Save configuration
CTRL Change to RF POWER OUTPUT mode

RF Attenuation Display

The output power of the TX can be attenuated in this mode. When the UP ↑ or DOWN ↓ key is pressed, the transmitter will step through the attenuated power settings in 1 dB steps for Low Frequency TX and 0.5 dB for High Frequency Band TX. The maximum allowable value is factory defined, default value is –7dB. When the UP or DOWN key is pressed, "TX" which appears on the upper left corner of the display will blink indicating that a new setting has been chosen. When the *ENTER* key is pressed the entry will be accepted and stored in the Transmitter memory. The RF Attenuation display and control functions are shown below:

UP ↑	Increment Attenuation
DOWN ↓	Decrement Attenuation
ENTER	Save Attenuation
CTRL	Change to RF ON/OFF mode.

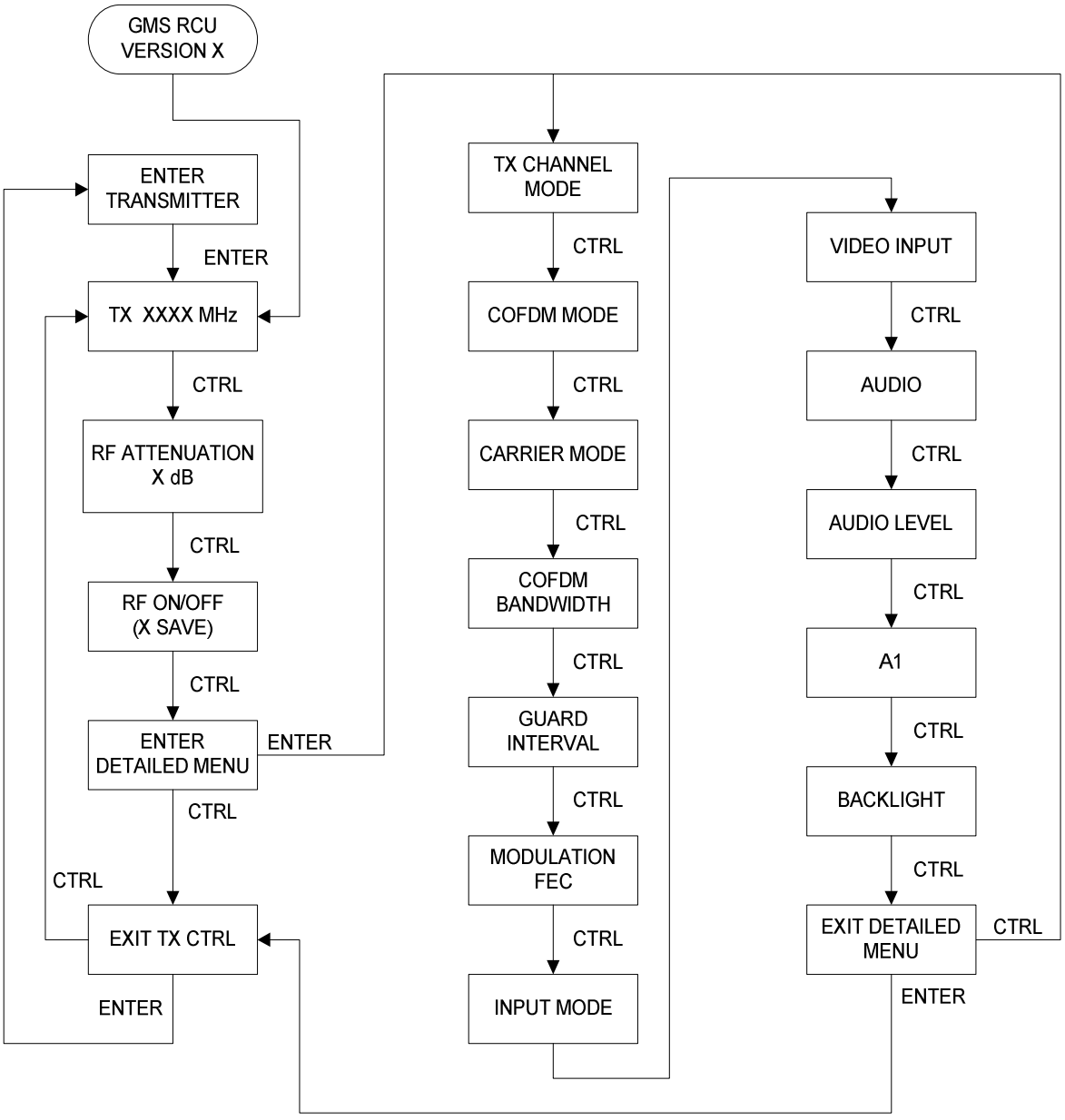


Figure 4.1 RCU Flowchart

RF On mode

Turns RF Output ON/OFF. Has the following selections:

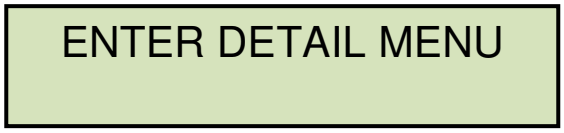
RF ON (Save): turns RF ON, on the next power up RF signal will be ON.
RF OFF (Save) : turns RF OFF, on the next power up RF signal will be OFF.
RF ON (do not save) : turns RF ON, on the next power up RF signal will be as in previous state.
RF OFF (do not save): turns RF OFF, on the next power up RF signal will be as in prevous state.

The RF Output display and control functions are shown below:

UP/DOWN ↑↓ Toggle RF ON/OFF
ENTER Save
CTRL Enter the Detailed menu

Enter Detailed Menu

This menu includes submenus that are described in sections 5.0 and 6.0.
Control functions are shown below:



ENTER Go to Channel Mode
CTRL Go to EXIT TX CTRL Menu

Exit TX CTRL

Sets RCU to initial mode.

ENTER Return to main menu
CTRL Return Initial State Display

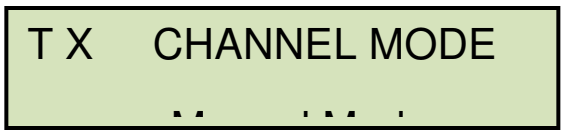
Blinks until CTRL or ENTER pressed.

5.0 SDMT, Detailed Menu Controls and Displays

TX Channel Mode

In this mode the user is allowed to select between Manual Mode and User Defined Mode . In Manual Mode the user can directly enter the desired operational frequency. In user Defined Mode there are 30 preprogrammed channels, so user can only select the frequencies that correspond to these channels.

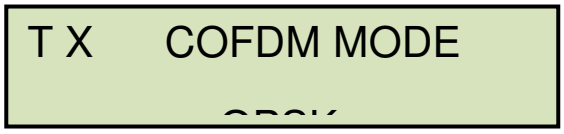
For S2 band only there are two additional selections New BAS and Old BAS with BAS frequencies programmed.



UP/DOWN ↑↓ Toggle Manual Mode/User Defimed /Old BAS /New BAS
ENTER Save
CTRL Change to COFDM Mode submenu

COFDM Mode

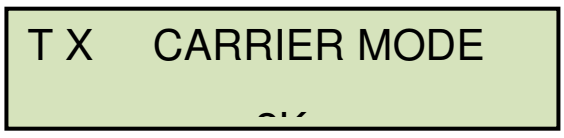
The two modulation types that can be selected in this mode are QPSK or 16 QAM. Using the UP ↑ or the DOWN ↓ key the modulation type can be set to QPSK or 16 QAM. Use the ENTER key to save the setting.



UP/DOWN ↑↓ Toggle COFDM Mode QPSK/16QAM
ENTER Save
CTRL Change to Carrier Mode submenu

Carrier Mode

This is not a valid selection for SDMT. SDMT has only 2K mode, so when the setting is chaged to 4K it will go back to 2K after Enter.



UP/DOWN ↑↓ Toggle Carrier Mode 2k/4K
ENTER Save
CTRL Change to COFDM Bandwidth submenu

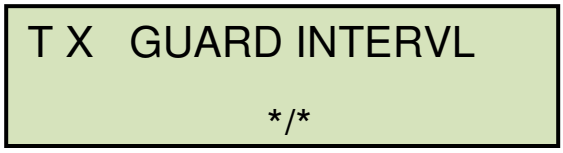
COFDM Bandwidth

The COFDM channel bandwidth selections are 6, 7, or 8 MHz. Use the UP ↑ or the DOWN ↓ to scroll thru display to make a selection. Use the ENTER key to save the setting.

UP/DOWN ↑↓ Toggle COFDM Bandwidth 6/7/8 MHz
ENTER Save
CTRL Change to Guard Interval submenu

Guard Interval

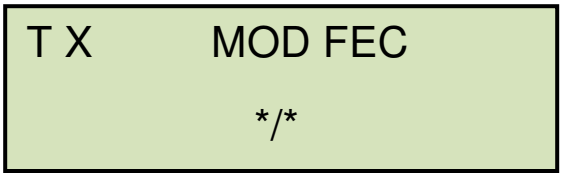
The Guard interval is inserted between symbols, to eliminate intersymbol interference caused by multipath. Longer guard periods allow more distant echoes to be tolerated. However, longer guard intervals reduce the channel efficiency.



UP/DOWN ↑↓ Change Guard Interval values to 1/4;1/8; 1/16; 1/32;
ENTER Save
CTRL Change to Mod FEC submenu

Modulation FEC

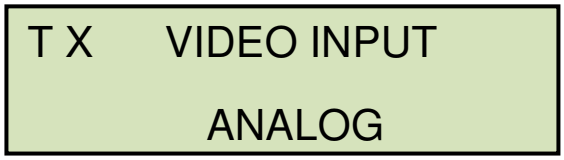
To detect and correct transmission errors the SDMT uses Forward Error Correction (FEC) encoding scheme. The amount of correction can be selected.



UP/DOWN ↑↓ Change FEC values 1/2; 2/3; 3/4; 5/6; 7/8;
ENTER Save
CTRL Change to Input Mode submenu

Input Mode

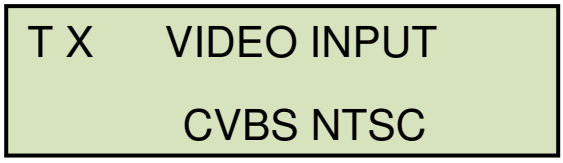
Depending on the model the transmitter can accept Video signal in three different formats: Analog, ASI, SDI. SDMTC transmitters have Analog only input Video format.
This selection is valid for SDMTS transmitters. The selections are Analog, ASI and SDI.



UP/DOWN ↑↓ Change Video Input to Analog, ASI or SDI
ENTER Save
CTRL Change to Video Input submenu

Video Input

In this mode the desired television and video standard can be selected. Use the UP ↑ or DOWN ↓ key to scroll thru the display to make a selection. The selection is available only for Analog Video Input Mode. The selections are Composite PAL, Composite NTSC with or without pedestal, S-video NTSC or PAL, Component NTSC or PAL . Use the ENTER key to save the setting.



UP/DOWN ↑↓ Change Video Standard to CVBS PAL, CVBS NTSC w/ Pedestal, CVBS NTSC, S-video NTSC, S-video PAL, Component NTSC or PAL
ENTER Save
CTRL Change to Audio submenu

Audio

The audio encoder can be enabled (ON) or disabled (OFF) in this mode. Use the UP ↑ or the DOWN ↓ to toggle either on or off. Use the ENTER key to save the setting. TX is flashing until ENTER key is pressed.

UP/DOWN ↑↓ Toggle Audio Encoder ON/OFF
ENTER Save
CTRL Change to Audio Level submenu

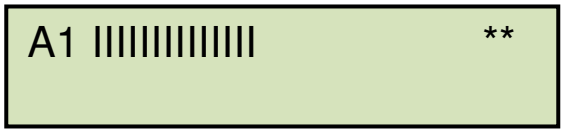
Audio Level

Audio level can be set to two values – MIC or LINE

UP/DOWN ↑↓ Toggle Audio Level MIC/LINE
ENTER Save
CTRL Change to Audio Gain submenu

Audio Gain

The Audio Gain range is 0 to 99. A1 is flashing when the value is changed but not saved.



UP ↑	Increment Audio Gain
DOWN ↓	Decrement Audio Gain
ENTER	Save
CTRL	Change to TX Channel mode submenu

Backlight

The RCU 2000 power saving mode display provides the option to enable the backlight on continuous (ON) or auto mode (Auto). In auto mode, the display backlight will go off if there is no key pressed within 1 minute. The display back light comes on again when the user presses any key.

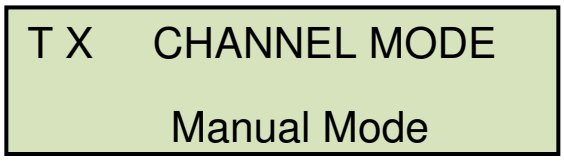
UP/DOWN ↑↓	Toggle Backlight ON/AUTO
ENTER	Save
CTRL	Change to TX Channel mode submenu

6.0 MDT, Detailed Menu Controls and Displays

TX Channel Mode

In this mode the user is allowed to select between Manual Mode and User Defined Mode . In Manual Mode the user can directly enter the desired operational frequency. In user Defined Mode there are 30 preprogrammed channels, so user can only select the frequencies that correspond to these channels.

For S2 band only there are two additional selections New BAS and Old BAS with BAS frequencies programmed. If New BAS or Old is selected for any other frequency band transmitter, after pressing Enter key the RCU will return to the previous setting.



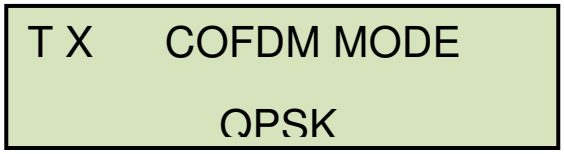
UP/DOWN ↑↓ Toggle Manual Mode/User Defimed /Old BAS /New BAS

ENTER Save

CTRL Change to COFDM Mode submenu

COFDM Mode

The three modulation types that can be selected in this mode are QPSK, 16 QAM or 64 QAM. Using the UP ↑ or the DOWN ↓ key the modulation type can be set to QPSK, 16 QAM or 64 QAM. Use the ENTER key to save the setting.



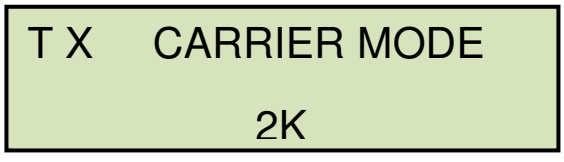
UP/DOWN ↑↓ Toggle COFDM Mode QPSK/16QAM/64QAM

ENTER Save

CTRL Change to Carrier Mode submenu

Carrier Mode

MDT series Transmitters have two carrier modes – 2K and optional 4K, which is factory defined and has to be purchased. If the particular Transmitter has 4K option, then the receiver also should be set to 4K to be able to receive the signal. The carrier mode can be changed to 4K only if the Transmitter has that option.

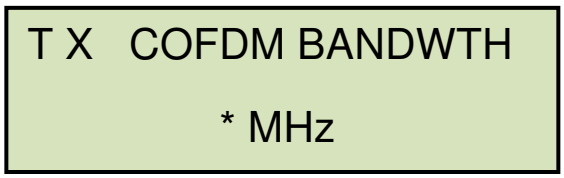


UP/DOWN ↑↓ Toggle Carrier Mode 2k/4K
ENTER Save

CTRL Change to COFDM Bandwidth submenu

COFDM Bandwidth

The COFDM channel bandwidth selections are 6, 7, or 8 MHz. Use the UP ↑ or the DOWN ↓ to scroll thru display to make a selection. Use the ENTER key to save the setting.

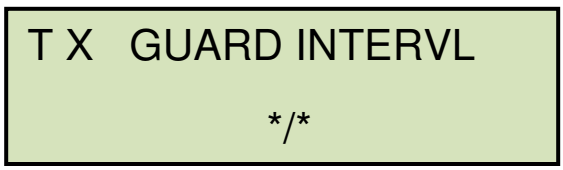


UP/DOWN ↑↓ Toggle COFDM Bandwidth 6/7/8 MHz
ENTER Save

CTRL Change to Guard Interval submenu

Guard Interval

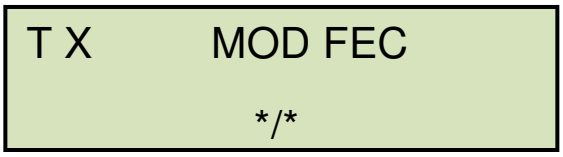
The Guard interval is inserted between symbols, to eliminate intersymbol interference caused by multipath. Longer guard periods allow more distant echoes to be tolerated. However, longer guard intervals reduce the channel efficiency.



UP/DOWN ↑↓ Change Guard Interval values to 1/4;1/8; 1/16; 1/32;
ENTER Save

CTRL Change to Mod FEC submenu

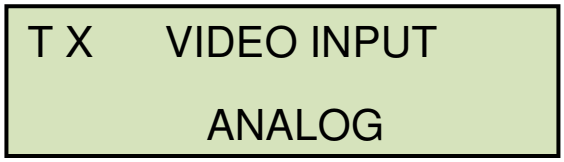
Modulation FEC
To detect and correct transmission errors, the MDT TX uses Forward Error Correction (FEC) encoding scheme. The amount of correction can be selected.



UP/DOWN ↑↓ Change FEC values 1/2; 2/3; 3/4; 5/6; 7/8;
ENTER Save

CTRL Change to Input Mode submenu

Input Mode
All MDT transmitters can accept Video signal in three different formats: Analog, ASI, SDI. The only exception is MDT-A transmitter, which only has ASI input Video format.
The selections are Analog, ASI and SDI.

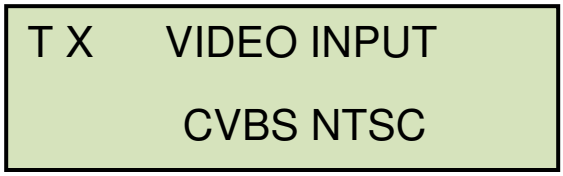


UP/DOWN ↑↓ Change Video Input to Analog, ASI or SDI
ENTER Save

CTRL Change to Video Input submenu

Video Input

In this mode the desired video standard can be selected. Use the UP ↑ or DOWN ↓ key to scroll thru the display to make a selection. The selection is available only for Analog Video Input Mode. However, switching between PAL and NTSC is possible only through Control SW. The selections for PAL are Composite, S-Video and Component; for NTSC - Composite NTSC with or without pedestal, S-video and Component . Use the ENTER key to save the setting.



UP/DOWN ↑↓ Change Video Standard for PAL: Composite, S-video or Component
NTSC: CVBS NTSC w/ Ped, CVBS NTSC, S-video or Component
ENTER Save

CTRL Change to Audio submenu

Audio

The audio encoder can be enabled (ON) or disabled (OFF) in this mode. Use the UP ↑ or the DOWN ↓ to toggle either on or off. Use the ENTER key to save the setting. TX is flashing until ENTER key is pressed.

UP/DOWN ↑↓ Toggle Audio Encoder ON/OFF
ENTER Save

CTRL Change to Audio Level submenu

Audio Level

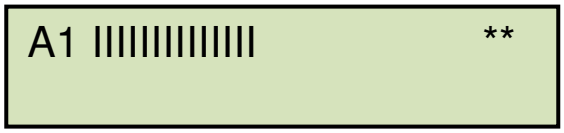
Audio level can be set to two values – MIC or LINE

UP/DOWN ↑↓ Toggle Audio Level MIC/LINE
ENTER Save

CTRL Change to Audio Gain submenu

Audio Gain

The Audio Gain range is 0 to 99. A1 is flashing when the value is changed but not saved.



UP ↑ Increment Audio Gain
DOWN ↓ Decrement Audio Gain
ENTER Save
CTRL Change to TX Channel mode submenu

Backlight

The RCU 2000 power saving mode display provides the option to enable the backlight on continuous (ON) or auto mode (Auto). In auto mode, the display backlight will go off if there is no key pressed within 1 minute. The display back light comes on again when the user presses any key.

UP/DOWN ↑↓ Toggle Backlight ON/AUTO
ENTER Save
CTRL Change to TX Channel mode submenu

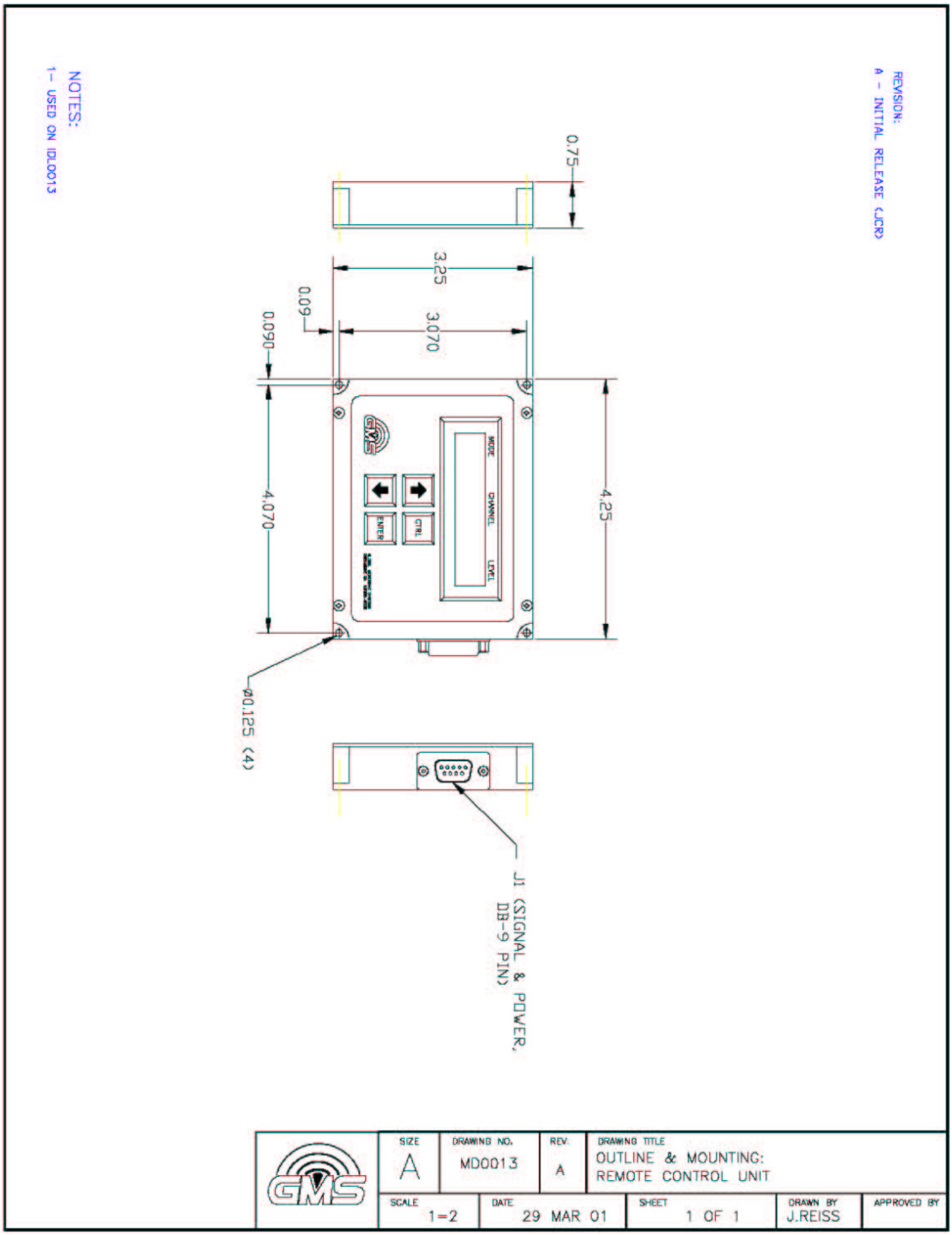
7.0 Specifications

Voltage	+8 to 32 V DC
Current	110 mA max.
Temperature	-20 C to 70 C Degrees
Humidity	0 to 100% non-condensing
Size	3.25" x 4.25" x 0.75"/ 8.25 cm x 10.8 cm x 1.90 cm
Weight	8 oz/222 g
Display	2 line, 16 characters per line, with backlight

The following is a pin-out information for DB-9 (RS-232) connections:

DESCRIPTION	DB-9M
Ground	5
TX (radio out)	3
RX (radio in)	2
DC Power	1

Appendix A: Outline and Mounting Drawing MD0013



Appendix B: Cable Assembly (MDT Standard) C0129

Appendix C: Cable Assembly (Camera box Standard) C0130