

Installation Instructions for
UCUB II

**Command Control Upgrade for all MTH® Protosounds®
Equipped locomotives**

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This installation manual includes several diagrams from page 25 and up. Please remove these diagrams to assist you in referencing them during this installation.

Introduction

Congratulations on your purchase of the long awaited UCUB II. The UCUB II is your best choice in Command Control upgrades for all MTH Protosounds 1 equipped locomotives and all other DC motor equipped locomotives with any QSI manufactured sound system such as QS-2, QS-2+, QS-3000 and QSI-OEM. Each UCUB II incorporates our patented DC offset circuit plus a whole lot more! Since the release of our original UCUB board in 1998 we have gained a lifetime's worth of knowledge in the TMCC upgrade field. The UCUB II incorporates a ton of improvements over our original UCUB. Improvements such as a larger heat sink, regulated lighting voltage outputs (no need to add resistors!), Plug –in compatibility with MTH locomotives and much much more!

There are a few things you should know about the UCUB II prior to starting your installation. First, you will lose your coupler arming and firing sounds with all QSI manufactured sounds, however, you will have control over both couplers from the Cab-1 remote. Secondly, the UCUB II is a Command Control only upgrade. When you install the UCUB II you will eliminate the battery backup (and all the troubles with the discharged batteries will be a thing of the past!) therefore when you press the direction button in a conventional environment the sounds will drop out. (The sounds will also act erratic below 8 volts in a conventional mode.). Due to certain patents owned by QSI it is impossible for us to include the battery backup circuit and make it function the way it did originally without infringing on their patented intellectual property (not only did it provide backup power for the sound system, but it also recharged the battery as well). Third, the UCUB II only provides control of the original QSI sound systems, in no way will the UCUB II improve the sound quality or increase the features included in QSI products. Fourth, Even though you will be operating in a command environment using either the Lionel Cab-1 remote or the DCS Handheld remote, the sound system will respond the same way it did in a conventional mode (i.e. the horn and bell keys only toggle the bell when the locomotive sits at idle. Only when the train is moving will the horn key affect the horn and the bell key affect the bell. However, if you follow the instructions we have included in this installation manual you can program the horn or whistle to sound in neutral.) Finally, we are certain that the UCUB II will provide years of enjoyment to your 3-Rail locomotives and we encourage you to visit our website at www.tastudios.com for more exciting command control upgrades.

Before you begin your UCUB II installation we encourage you to review these instructions thoroughly. Read them over at least once so you are completely familiar with the installation process prior to starting the installation.

UCUB II Features

Each UCUB II will effectively convert your Protosounds 1.0 locomotive to be 100% compatible with Lionel Trainmaster Command Control. Once your installation is complete, here is what features your locomotive will have;

- 1.) Constant voltage directional lighting (no need to add resistors!)
- 2.) Front and rear coil coupler control from the Cab-1 remote
- 3.) Constant voltage marker lights (on all the time while power is supplied to the track)
- 4.) 100% use of Proto Station Announcements or Proto Freight Announcements
- 5.) Cab Chatter sounds when locomotive sits at idle for more than 30 seconds
- 6.) Squealing brakes sounds when the Cab-1 Brake key is pressed and held down (dependant on Protosounds unit)
- 7.) Cab-1 control of the horn and bell
- 8.) Cab-1 control of the smoke unit on or off
- 9.) 100% TMCC compatibility. Full use of momentum, stall voltage, high speed settings and lash-up commands
- 10.) 100% compatible with MTH Digital Command System (DCS)
- 11.) Programmable Engine ID number from 1-99

Upgrade Kit Contents

Each UCUB II command control conversion kit includes everything necessary to complete your installation. The contents of each kit are as follows;

- 1.) 1 UCUB II Command Upgrade Board
- 2.) 1 0.47uF 50 Volt Capacitor (Steam applications only)
- 3.) 1 SPDT program/run slide switch w/ 2 miniature screws and nuts
- 4.) 1 4-40 Coarse thread nut
- 5.) 5 Wire nuts
- 6.) Thick & Thin double-sided tape
- 7.) Copper foil antenna
- 8.) Complete installation manual

If your kit is missing any of these items, please contact TAsudios immediately at (330)533-7181 Monday-Friday 10a-6p EST.

Pre-installation Steps

PERFORM STEP 1 AND 2 BEFORE ANYTHING ELSE!

The snippet below is taken directly from the MTH locomotive operators manual and explains how to access the RESET positions in your MTH Protosounds 1 equipped locomotives. Please follow these instructions closely to successfully complete Step numbers 1 and 2.

“Using RESET to program Proto-Sounds®”

(Please note that RESET is accessed upon initial power up. Turn the throttle on (be careful not exceed 10 volts) and wait for 5 seconds, after you hear the startup sounds (approximately 5 seconds) follow the instructions below to access the RESET features required in steps 1 and 2.)

“Proto-Sound® is equipped with several programmable features which are accessed in the RESET state by moving the transformer throttle up and down between full voltage and low voltage (8 volts) without shutting the transformer off completely. Each time this is done you advance, one feature at a time, through the available options. An air-release sound is heard each time the throttle is advanced and returned. In addition, there are special sounds to tell you what RESET position you are in.”

“For example, if you want to select Feature 2, put the engine in RESET, and move the throttle up and down from full throttle to low two times. After the second advance you will hear two “clinks” indicating that the computer is now in Feature 2. Advance the throttle again and you will hear 3 “clinks” for Feature 3. Advance it two more times and you will hear a “clank” indicating that you are now in Feature 5. Advance the throttle two more times and you will a “clank” and two “clinks” indicating Feature 7. ((5 throttle advancements = 1 clank) + (2 throttle advancements = 2 clinks)). “Clank” + “Clink” + “Clink” = Feature 7. You can advance the throttle as quickly as you like and the computer will still remember the number of times the throttle is advanced by playing back the number of “Clinks” and “Clanks” to confirm the feature you’ve selected.”

Quoted from an MTH locomotive owners manual.

Step Number 1

Factory Default Setting

Before you even remove the shell you first need to access the RESET features in the Protosounds system to set the FACTORY DEFAULT setting. This is RESET feature 18 in your Protosounds 1 system. The snippet below is direct from the MTH locomotive owners manual. Please follow these steps exactly to complete this task. Once the Protosounds system is installed in the UCUB II you will be unable to access the reset features.

“Resetting all Proto-Sound® options to factory default settings”

“ RESET 18 is the most powerful of the REST features available. Using REST 18 allows you to override all changes in programming and return all RESETS to the original, out of the box settings. To use, cycle to RESET 18 [3 “Clanks” and 3 “Clinks”] and press the Whistle button. The engine will play a distorted bell, followed by a clear bell sound. This indicates that the Proto-Sound® system has restored all settings to factory default settings. Lock the changes by interrupting the throttle and cycling the engine into forward.”

Quoted from an MTH locomotive owners manual.

Step Number 2

Enable the Horn/Whistle in neutral

If you recall, Protosounds 1 was designed for use exclusively in a conventional environment. When the locomotive was in neutral both the horn and bell buttons activated the bell only. This was done so that when you turned the voltage above 12 volts you could use the Horn button to arm and then fire the Protocoupler. When using Protosounds with the UCUB II the couplers are controlled from the Cab-1 and not from the horn button. If you do not change the reset setting in the Protosounds system the same operation will result in a command environment. Therefore, we highly recommend you enable the horn/whistle in neutral setting. To perform this step, please follow the snippet from the MTH locomotive manual below:

“Programming for horn/whistle in neutral operation”

“RESET Feature 25 allows you to operate the Horn/Whistle while the engine is in the neutral state. When ON, pressing the horn/whistle button while in neutral will cause the horn/whistle recording to sound. To use, cycle to RESET 25 [5 “Clanks”] and press the horn/whistle button. The engine will play a series of bells. This indicates the current setting. Each time the horn/whistle is pressed, Proto-Sound® will cycle to the next available setting and provide the appropriate bell indicator. The settings for RESET 25 are 1 Bell = horn/whistle OFF, 2 Bells = horn/whistle ON [You want to set your engine with 2 Bells, horn/whistle ON]. When the desired setting is reached, lock the changes by interrupting the throttle and cycling the engine into forward.”

Quoted from an MTH locomotive owners manual.

Once you have completed the reset feature changes please test the locomotive to verify that you have made the setting changes correctly. Once you have verified the horn/whistle does in fact sound in neutral you can proceed with the installation process.

Installation

These instructions are broken down into three categories; MTH Premier Diesel locomotives, MTH Railking Diesel locomotives and MTH Steam locomotives (Premier and Railking). If you have a locomotive constructed by a manufacturer other than MTH please follow the instruction set that most closely relates to your locomotive.

MTH Premier Diesel Installation

Removing the original electronics

To begin the installation, remove the screws that hold the body to the frame. Carefully remove the shell, in most instances the shell will separate from the frame without any wires attaching one to the other. Once the shell has been removed set it aside.

Upon initial inspection of the locomotive innards you will see the reverse unit and sound system. There will be either a piece of electrical tape or a plastic device holding the two boards together. The top board (the one with a 3-pin and 2-pin plug at one end of the board) is the Protosounds board. The bottom board is the DCRU (reverse unit). Notice how the DCRU is mounted to the frame of the locomotive, the UCUB II will mount the same way using the original hardware.

Before you remove anything, locate the white 2-position connector on the top of the DCRU where the 8.4V battery connects. Unplug this battery connection so no damage occurs to the sound system when you remove it from the bottom board. The diagram on the last page illustrates the location of the battery plug on an MTH DCRU, please refer to it for clarity.

Once you have unplugged the battery set it aside, you will NOT be required to reinstall it. It is your choice to leave it inside the locomotive or remove it altogether.

Either cut the electrical tape or remove the plastic holder that holds the top and bottom boards together. Unplug the 3-position potentiometer plug and the 2-position speaker plug from the top soundboard. Please note that the metal wire crimps, in the black connectors, are visible from the top (if you have them reversed when you reinstall them no damage will occur, but the volume control will be opposite from what it is now). Once you have unplugged the 2-pin and 3-pin connectors you need to separate the two boards. Carefully grab the short ends of the top soundboard and gently rock the soundboard back and forth while applying upward pressure. Once the top soundboard is free from the two 8-pin female connectors on the bottom reverse unit set it aside.

Now you should be able to clearly see the reverse unit and how it is mounted to the frame. Notice that there is a long screw that comes up through a threaded hole on the front end of the reverse unit. The second screw will be connecting a voltage regulator to a bracket under the reverse unit towards the rear of the reverse unit (the end opposite the black or gray relays (large rectangles on the top of the reverse unit)). The UCUB II will mount in your locomotive the same way the current reverse unit is mounted

Carefully locate the Phillips head screw on the bottom of the locomotive frame (the one that screws into the reverse unit now). Loosen the screw until it is free and set it aside. Now locate the single screw that is connecting the voltage regulator to its mount. Take this screw out and set it aside (don't lose these screws, you will need them to mount the UCUB II back to the frame!). The reverse unit should now be loose.

Locate the blue 4-position connector on the extreme rear of the reverse unit (refer to the diagram on the last page for clarity). Unplug this connector (it connects to both coil couplers). Now unplug the following color-coded plugs on the bottom of the reverse unit; Red, Black, Yellow, White, Blue and Green. ***If your locomotive has two wires soldered to the underside of the reverse unit, clip them off, but be sure to clearly mark them as the "front light" for future reference.*** Finally locate the only yellow 2-position connector on the top of the reverse unit (your locomotive may or may not have a harness installed in this plug). If your locomotive does have a harness plugged into the top Yellow plug remove it. Please do not confuse the bottom Yellow plug with the top Yellow plug. Mark this plug if necessary to avoid any confusion.

Once all the connectors are unplugged remove the original reverse unit and set it aside.

Mounting & wiring the UCUB II

Locate the UCUB II board and orient it so the bottom connectors are in the same location as the original reverse unit connectors were. (This will be obvious as the UCUB II will only install one way because you will be reusing the original mounting brackets.) Using the color-coded plugs on the bottom of the UCUB II reconnect the original plugs. Red connector to Red plug, Black connector to Black plug, Yellow connector to Yellow plug (do not get this confused with the Yellow plug you removed from the top of the original reverse unit), White connector to White plug (no paint marking) Green connector to Green plug and finally blue connector to Blue plug. Once the connectors have been plugged into the UCUB II you are ready to mount it in the locomotive.

NOTE: If your reverse unit had 2 wires soldered to the underside of the original reverse unit locate them now, they should be marked as "front light". These two wires make up the front headlight leads. The bulbs run on more voltage than the UCUB II front light connector provides. Therefore you will need to connect one of the front headlight wires to the blue wire soldered to the underside of the UCUB II underneath the black Command Receiver board. The remaining front headlight wire connects to the original black wire bundle in the locomotive, held together with a wire nut.

The diagram on the last page illustrates exactly where this wire is located. Please refer to it for clarity.

Place the UCUB II in the same position as the original reverse unit. Using the small screw you removed earlier from the voltage regulator attach the UCUB II voltage regulator to the same position the original reverse unit was mounted to. There is no need to reinstall the clear plastic insulator that was between the original voltage regulator and the mounting post nor is it necessary to retain the nylon shoulder washer on the screw. (In the event the original voltage regulator was bent at a 90 Degree angle carefully bend the UCUB II voltage regulator over to match that of the original reverse unit. MAKE CERTAIN you insulate the regulator so it does not short out against the bottom of the UCUB II board!) Once the voltage regulator is mounted to the bracket locate the long screw you removed earlier (it held the DCRU in place) and the 4-40 coarse thread nut provided with the upgrade kit (in a clear plastic baggie). Insert the long screw through the same hole you removed it from. Reinstall the aluminum spacer if there was one. Using the nut provided tighten the screw and nut until the UCUB II is held firmly in place.

It may appear as though the UCUB II is slightly off center when compared to the original reverse unit. This is normal and will not affect the performance of the UCUB II.

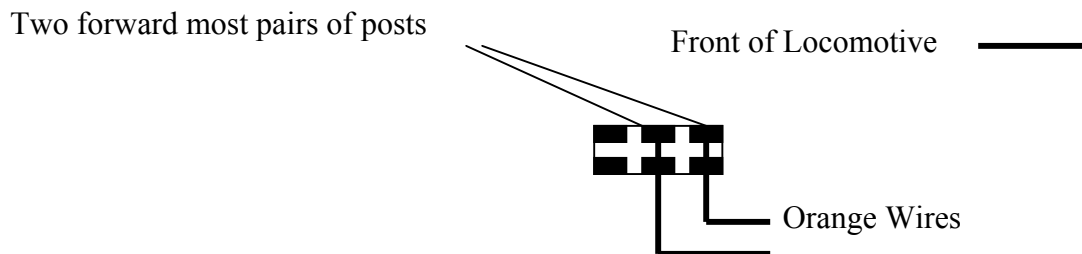
Wiring the Protocouplers

Once the UCUB II is firmly installed on the locomotive frame and the plugs are firmly installed in the color-coded connectors we need to wire the Protocouplers to the UCUB II. Currently the couplers are connected to a selector switch. We will eliminate the selector switch and it will become our Program/Run switch. Locate the Blue 4-position connector that was originally plugged into the extreme rear of the reverse unit. Clip the Blue connector off the end of the wires. There will be a total of 3 wires in this connector. One of which connects to the coupler selector switch mounted to the frame (you want to remove the wire connected to the center pair of pins on the switch). One of the remaining wires will connect to one Protocoupler, while the other remaining wire connects to the opposite Protocoupler. Each Protocoupler will have 2 wires, both of these wires (from each Protocoupler) must connect to the UCUB II for reliable operation. Locate the two wires from each Protocoupler (it is easier to locate the coupler wires where they come through the frame, both wires will be inside a black sleeve). (One wire from each Protocoupler will be soldered to the coupler selector switch, remove it from the switch altogether.) Locate the two blue wires on

the UCUB II. These two blue wires need to connect to the two wires from the FRONT Protocoupler. Locate the two white wires on the UCUB II. These two white wires need to connect to the two wires from the REAR Protocoupler. If your locomotive is not equipped with a front or rear Protocoupler and you have determined that one cannot be installed, simply clip either the blue or the white wires off the UCUB II. Please refer to the diagram on the last page for clarity.

Wiring the Program/Run switch

As we mentioned before the coupler selector switch will become the Program/Run switch. Locate the two orange wires on the UCUB II (these wires will have a switch soldered to the end of them). For diesel installations simply clip the switch off the ends of the Orange wires. Route these wires to the original coupler selector switch. You will need to solder these wires to the switch. To keep some consistency in these upgrades we highly recommend soldering the two orange wires to the two pairs of posts closest to the front of the locomotive. This will leave the remaining set of posts towards the rear of the locomotive. The diagram below illustrates this.



Once you have soldered the wires on the switch please be sure the switch lever is towards the rear of the locomotive, so the switch will be in the Run position when you are ready to test the locomotive.

Wiring the Protosmoke unit

If your locomotive is equipped with a smoke unit locate the smoke on/off switch. There will be two wires connected the switch. One wire will connect to the smoke unit, while the other wire connects to the wire nut with all red wires. We are interested in the red wire that connects to the wire nut. Remove the red wire from the wire nut bundle (the one connected to the smoke on/off switch), Please make sure the remaining red wires are firmly connected when you reinstall the wire nut. Connect the red wire you just removed to the red wire coming from the top of the UCUB II. This will allow you to turn the smoke unit on and off from the Cab-1.

Installing the Protosounds board

Locate the top Protosounds board you removed at the beginning of the installation. Referring to the diagram on the last page carefully plug the Protosounds board into the UCUB II. The diagram below illustrates how the Protosounds board installs in the UCUB II. DO NOT install the Protosounds board backwards, as permanent damage will occur to the soundboard. Once you have plugged the Protosounds board into the UCUB II wrap a piece of electrical tape around the two boards to ensure they don't separate over time. If your locomotive had two black plastic halves DO NOT reuse them, instead use a piece of electrical tape.

Take notice of the yellow capacitor on the bottom of the Protosounds board. This small capacitor will keep the soundboard far enough away from the R2LC to prevent any shorts from occurring. The diagram on the last page illustrates this, please refer to it for clarity.

Once the Protosounds board is in place locate the 2-position speaker plug and the 3-position volume pot plug. Plug these connectors back into their respective 2-pin and 3-pin (connectors with the metal wire crimps (seen through the black connectors) facing upwards).

Constant Voltage marker Lights

If your Premiere locomotive is equipped with marker lights that are not powered from the track now is the time to connect them to the UCUB II. If your marker lights got their power from the Yellow connector on the topside of the DCRU locate that Yellow connector now. Plug the Yellow constant voltage marker light lead into the yellow plug on the top of the UCUB II board. Please do not get this wire confused with the yellow motor lead wires.

Reinstalling the shell

To complete the installation, set the shell next to the frame of the locomotive up side down. Locate the antenna attached to the top of the UCUB II board. Remove the paper strip on the backside of the antenna to expose the adhesive. Place the adhesive side of the antenna to the inside center roof of the locomotive shell. Be careful the antenna does not overlap the smoke stack (if so equipped). Place a piece of electrical tape over the copper antenna to prevent a short from occurring in the event the antenna should ever droop off the roof.

Carefully replace the shell on the frame. Be careful not to pinch any wires between the shell and the frame. Reinstall the screws and proceed to page 22 to test your new Command Controlled MTH Premier Diesel locomotive!

MTH Railing Diesel Installation

Once you have completed steps 1 and 2 follow the instructions below.

Removing the original electronics

To begin the installation, remove the screws that hold the body to the frame. Carefully remove the shell, in most instances the shell will separate from the frame without any wires attaching one to the other. Once the shell has been removed set it aside for now.

Upon initial inspection of the locomotive innards you will see the reverse unit and sound system. There will be either a piece of electrical tape or two plastic halves holding the two boards together. The top board (the one with a 3-pin and 2-pin plug at one end of the board) is the Protosounds board. The bottom board is the DCRU (reverse unit). Notice how the DCRU is mounted to the frame of the locomotive, the UCUB II will mount the same way using the original mounting hardware.

Before you remove anything, locate the white 2-position connector on the top of the DCRU where the 8.4V battery connects. Unplug this battery connection so no damage occurs to the sound system when you remove it from the bottom reverse unit board. The diagram on the last page illustrates the location of the battery plug on an MTH DCRU (reverse unit), please refer to it for clarity.

Once you have unplugged the battery set it aside, you will NOT be required to reinstall it. It is your choice to leave it inside the locomotive or remove it altogether.

Either cut the electrical tape or remove the plastic holder that holds the top and bottom boards together. Unplug the 3-position potentiometer plug and the 2-position speaker plug from the top soundboard. Please note that the metal wire crimps inside the connectors are visible from the top (if you have them reversed when you reinstall them no damage will occur, but the volume control will be

opposite from what it is now). Once you have unplugged the 2-pin and 3-pin connectors you need to separate the two boards. Carefully grab the short ends of the top soundboard and gently rock the soundboard back and forth while applying upward pressure. Once the top soundboard is free from the two 8-pin female connectors on the bottom reverse unit set it aside.

Now you should be able to clearly see the reverse unit and how it is mounted to the frame. Notice that there is a long screw that comes up through a threaded hole in the front end of the reverse unit. The second screw will be connecting a voltage regulator to a bracket under the reverse unit, towards the rear of the reverse unit (the end opposite the black or gray relays (large rectangles on the top of the reverse unit). The UCUB II will mount in your locomotive the same way the current reverse unit is mounted

Carefully locate the Phillips head screw on the bottom of the locomotive frame (the one that is screwed into reverse unit now). Loosen the screw until it is free and remove the screw, set it aside (also remove, but do not discard, the round aluminum spacer from between the reverse unit and frame, if so equipped). Now locate the single screw that is connecting the voltage regulator to its mount. Take this screw out and set it aside (don't lose these two screws, you will need them to mount the UCUB II on the locomotive frame!). The reverse unit should now be loose.

Locate the blue 4-position connector on the extreme rear of the reverse unit (refer to the diagram on the last page for clarity). Unplug this connector (it connects to both coil couplers). Now unplug the following color-coded plugs on the bottom of the reverse unit; Red, Black, Yellow, White, Blue and Green. Your specific Railking locomotive may or may not have a rear directional light. If it does not have a rear light there will not be a plug in the Green connector.

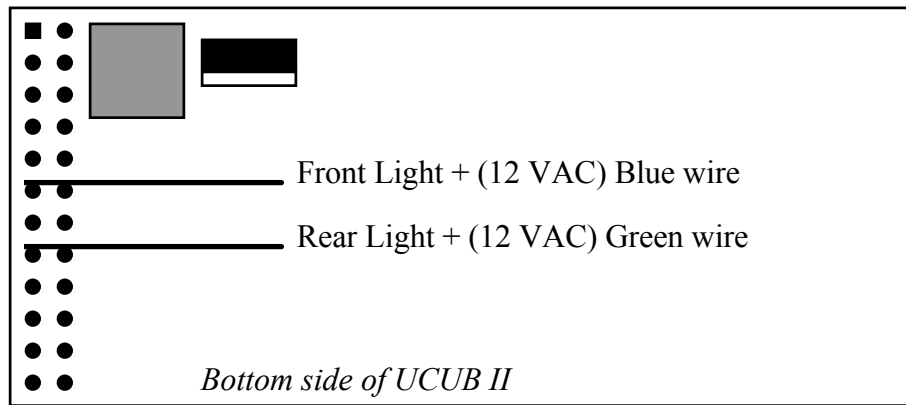
Once all the connectors are unplugged remove the original reverse unit and set it aside.

Mounting & wiring the UCUB II

Locate the UCUB II board and orient it so the bottom connectors are in the same location as the original reverse unit connectors were. (This will be obvious, as the UCUB II will only install one way because you will be reusing the original mounting brackets.) Using the color-coded plugs on the bottom of the UCUB II reconnect the original plugs. Red connector to Red plug, Black connector to Black plug, Yellow connector to Yellow plug and White connector to White plug (no paint marking).

MINIATURE HEADLIGHTS: If your Railking locomotive is equipped with miniature headlights (they will be mounted in the clear plastic headlight insert in the shell and wires to these lights connect to the frame by way of a small 2 position copper spring bracket) then follow these directions for connecting it to the UCUB II. If the headlights are not attached to the shell, follow the instructions for "Bayonet Headlights" below. Plug the Green connector to Green plug and finally the Blue connector to Blue plug on the UCUB II.

BAYONET HEADLIGHTS: Most Railking diesel locomotives are equipped with 14VAC bayonet bulbs. These bulbs use a higher voltage than the fixed voltage outputs provided on the Green and Blue connectors. If your locomotive is equipped with a bayonet bulb you will be required to clip the Blue and Green color-coded plugs off the ends of the headlight wire leads. Connect the front headlight (most often a Blue wire or originally plugged into the Blue connector) to the blue wire soldered to the underside of the UCUB II underneath the black Command Receiver board. Connect the rear headlight wire lead (most often a Green wire or plugged into the GREEN connector) to the Green wire soldered to the underside of the UCUB II.



NOTE: If you do not use the Blue and Green wires on the bottom of the UCUB II, please clip them off to prevent any short circuits from occurring.

Once the connectors have been plugged into the UCUB II you are ready to mount it (the UCUB II) in the locomotive.

Place the UCUB II in the same position as the original reverse unit. Using the small screw you removed earlier from the voltage regulator attach the UCUB II voltage regulator to the same position the original reverse unit was mounted to. There is no need to reinstall the clear plastic insulator that was between the original voltage regulator and the mounting post nor is it necessary to retain the nylon shoulder washer on the screw. (In the event the original voltage regulator was bent at a 90 Degree angle carefully bend the UCUB II voltage regulator over to match that of the original reverse unit. MAKE CERTAIN you insulate the regulator so it does not short out against the bottom of the UCUB II!) Once the voltage regulator is mounted to the bracket locate the long screw and nut provided with the upgrade kit. Insert the original long screw you removed earlier through the same hole you took it out of. Don't forget to reinstall the aluminum spacer if there was one. Using the nut provided tighten the screw and nut until the UCUB II is held firmly in place.

It may appear as though the UCUB II is slightly off center when compared to the original reverse unit. This is normal and will not affect the performance of the UCUB II.

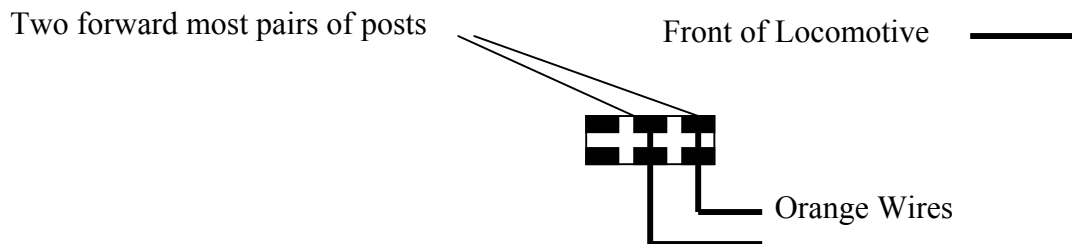
Wiring the Protocouplers

Once the UCUB II is firmly installed on the locomotive frame and the plugs are firmly installed in the color-coded connectors we need to wire the Protocouplers to the UCUB II. Currently the couplers are connected to a selector switch. We will eliminate the selector switch and it will become our Program/Run switch. Locate the Blue 4-position connector that was originally plugged into the extreme rear of the reverse unit. Clip the Blue connector off the end of the wires. There will be a total of 3 wires in this connector. One of which connects to the coupler selector switch mounted to the frame (you want to remove the wire connected to the coupler selector switch). One of the remaining wires will connect to one Protocoupler, while the other remaining wire connects to the opposite Protocoupler. Each Protocoupler will have 2 wires, both of these wires (from each Protocoupler) must connect to the UCUB II for reliable operation. Locate the two wires from each Protocoupler (it is easier to locate the coupler wires where they come through the frame, both wires will be inside a black sleeve). (One wire from each Protocoupler will be soldered to the coupler selector switch, remove it from the selector switch altogether.) Locate the two blue wires on the top of UCUB II. These two blue wires need to connect to the two wires from the FRONT Protocoupler. Locate the two white wires on the top of UCUB II. These two white wires need to connect to the two wires from the REAR Protocoupler. If your locomotive is not equipped with a front or rear Protocoupler and you have

determined that one cannot or will not be installed, simply clip either the blue or the white wires off the UCUB II. Please refer to the diagram on the last page for clarity.

Wiring the Program/Run switch

As we mentioned before the coupler selector switch will become the Program/Run switch. Locate the two orange wires on the UCUB II (These wires will have a switch soldered to the end. Simply cut the switch off the ends of the wires). Route these wires to the original coupler selector switch. You will need to solder these wires to the switch. To keep some consistency in these upgrades we highly recommend soldering the two orange wires to the two pairs of posts closest to the front of the locomotive. This will leave the remaining pair of unconnected posts towards the rear of the locomotive. The diagram below illustrates this.



Once you have soldered the wires on the switch please be sure the switch lever is towards the rear of the locomotive, so the switch will be in the Run position when you are ready to test the locomotive.

Installing the Protosounds board

Locate the top Protosounds board you removed at the beginning of the installation. Referring to the diagram on the last page carefully plug the Protosounds board into the UCUB II. DO NOT install the Protosounds board backwards, as permanent damage will occur to the soundboard. Once you have plugged the Protosounds board into the UCUB II wrap a piece of electrical tape around the two boards to ensure they don't separate over time.

Take notice to the yellow capacitor on the bottom of the Protosounds board. This small capacitor will keep the soundboard far enough away from the R2LC to prevent any shorts from occurring. The diagram on the last page illustrates this, please refer to it for clarity.

Once the Protosounds board is in place locate the 2-position speaker plug and the 3-position volume pot plug. Plug these connectors back into their respective 2-pin and 3-pin (connectors with the metal wire crimps (seen through the black connectors) facing upwards).

Reinstalling the shell

To complete the installation, set the shell next to the frame of the locomotive up side down. Locate the antenna attached to the top of the UCUB II board. Remove the paper strip on the backside of the antenna to expose the adhesive. Place the adhesive side of the antenna to the inside center roof of the locomotive shell. Place a piece of electrical tape over the copper antenna to prevent a short from occurring in the event the antenna should ever droop off the roof.

Carefully replace the shell on the frame. Be careful not to pinch any wires between the shell and the frame. Reinstall the screws and proceed to page 22 to test your new Command Controlled MTH Railing Diesel locomotive!

Premier Steam Locomotive Installation

Once you have completed step number 1 and 2 follow the instructions below.

Removing the original electronics

Begin the installation by removing the screws that hold the tender shell to the tender frame. Remove the tender shell, be careful not to pull the two pieces apart too quickly, there are wires connected between the shell and the original electronics. These wires will be connected to the Green reverse light plug and the Yellow marker light plug on the top of the DCRU (reverse unit). Once you have the shell off the tender carefully unplug these wires from the DCRU. (The diagram on the last page shows an overview of the DCRU. The wires you are unplugging will be in the connectors labeled Rear Light and Marker Light.) Once you have unplugged the wires from the DCRU set the tender shell aside.

You will now see the original electronics package. Some locomotives have the electronics mounted flat, while others have them mounted on their side. Regardless of how your particular locomotive electronics are mounted, the same instructions apply.

Locate and remove the only white battery connector located on the top of the bottom reverse unit. (Refer to the diagram on the last page for clarity.) This white connector will have a red and black wire in it and it makes up the battery harness. Unplug the battery harness from the DCRU so no damage occurs to the sound system when you remove it. It is up to you whether or not you want to leave the battery in the tender or remove it altogether (the battery is not used with the UCUB II). If you decide to remove the battery do so now.

You will see the top Protosounds board, which will have a 2-position (speaker plug) and 3-position (potentiometer, volume plug) plugged into the top on one end of the top soundboard. Carefully remove these plugs from their connectors by sliding them off their respective pins. Notice that you can see the metal crimps on the ends of the wire through the connectors. Please keep this orientation in mind when reinstalling these connectors. (If you get them up side down no damage will occur, but the potentiometer (volume control) will be backwards from the way it is now.)

Locate the electrical tape or 2 plastic brackets that hold the two boards together. Either cut the electrical tape or remove the plastic bracket and set them aside. Carefully grab the short ends of the top Protosounds board and gently rock it back and forth from end to end while applying gentle upward pressure. Once the soundboard is free from the two 8-pin female connectors set it aside.

You can now clearly see the bottom DCRU (reverse unit). Carefully locate the Phillips head screw that holds one end of the DCRU in place (this screw passes through the square bridge rectifier on the end of the DCRU closest to the large rectangular relays). Remove this screw and keep it nearby. Now locate the small screw that holds the voltage regulator in place. This screw will have a nylon shoulder washer on it (the diagram on the last page illustrates the location of these screws). Remove the small screw holding the voltage regulator in place and keep it nearby.

The DCRU should be free from its mounting position. Carefully unplug the Red, Black, Yellow and White connectors from the underside of the DCRU. These wires make up the tether that goes between the locomotive and tender. If your tender is equipped with a coil coupler unplug the 4 position blue connector from the extreme rear of the DCRU. Set the DCRU aside once you have unplugged the connectors.

Installing the UCUB II

The UCUB II will mount in the same exact position as the original DCRU. Before you reinstall the UCUB II on the tender frame plug in all the tether connectors. The UCUB II plugs are color-coded. Plug the Red connector to the red plug, the Black connector to the black plug, White to white (the White connector is not painted) and Yellow to yellow. All the tether connectors plug into the color-coded plugs on the bottom of the UCUB II. Once you have the connectors plugged in set the UCUB II in place. Using the original long

screw you removed from the DCRU insert it through the frame or mounting bracket (the same way you took it out). Locate the small 4-40 nut (enclosed in a plastic baggie) and twist it on the screw you just inserted. Tighten the nut so the UCUB II is firmly held in place. Locate the small screw you removed from the DCRU voltage regulator (the nylon shoulder washer is not required for the UCUB II, neither is the clear plastic insulator). Screw the UCUB II voltage regulator into the same mounting position the DCRU regulator was in. If the UCUB II looks slightly off level it is okay, it will not affect the performance of the UCUB II.

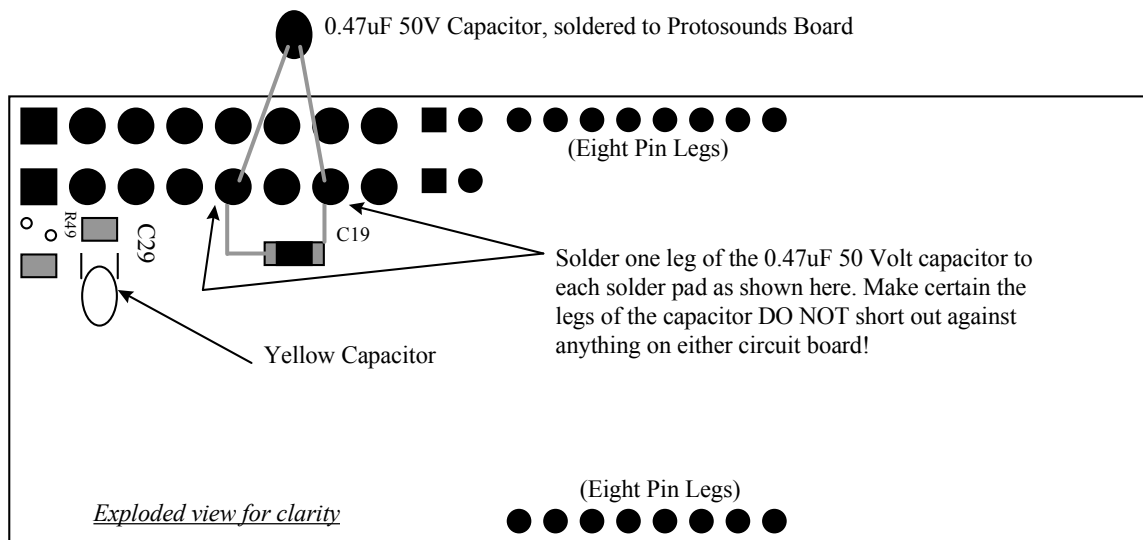
At this point you should have the UCUB II mounted on the tender frame. The 4-pin tether should be connected to the bottom side of the UCUB II. If this is not what your tender frame looks like, please backtrack through the above installation instructions to catch up before proceeding.

Steam Protosounds Preparation

If your locomotive is equipped with MTH Steam Protosounds you will need to make a small modification, which will require soldering. The original Protosounds system applied voltage to the motors at approximately 5 volts on the track (this is the voltage that each transformer applies when you turn on the throttle from the power off position). As a result the Protosounds soundboard does not chuff properly when coupled to the UCUB II (this is because the UCUB II applies motor voltage between zero and five volts). The method we use to correct the Protosounds chuff gap problem is to add a small capacitor to their chuff input circuit. The capacitor is included with your kit and located in a clear plastic baggie.

The photo on the next page illustrates exactly where this capacitor is added. Please take a great deal of care when soldering this component to your Protosounds board. Please ensure that the capacitor DOES NOT touch any other components on the soundboard, otherwise you may permanently damage your Protosounds board.

If you are uncomfortable soldering this component to your soundboard we can do it for you, free of charge. Simply send your Protosounds soundboard to us along with your capacitor and return shipping address. We'll add the capacitor and mail it right back to you the same day we receive it.

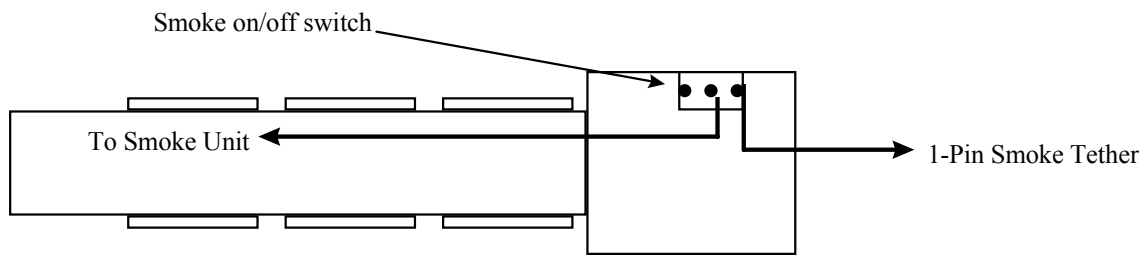


Bottom View of Protosounds Board

Wiring the Protosmoke Unit

If you want to control your smoke unit from the Cab-1 remote you will need to install a 1-pin tether between the UCUB II in the tender and the smoke on/off switch in the locomotive. This tether is available for \$2.00 and can be ordered from TASTudios directly or through your dealer.

Install the female end of the tether to the red wire on the UCUB II. Install the male end of the wire to the smoke on/off switch inside your locomotive. (You will need to remove the locomotive shell, locate the smoke on/off switch and identify which wire is connected to the smoke unit and which wire is connected to the center rail pickup rollers. The male end of the 1-pin tether replaces the center rail pickup wire on the switch. After you have soldered the 1-pin tether in place you can reattach the locomotive shell. Please take care in routing the 1-pin tether out the back of the locomotive, make sure it does not short out against the frame and/or shell.) Be sure to leave enough wire sticking out from both the tender and locomotive. If the wire is too short it may come unplugged on tight curves. The diagram below illustrates where to connect the wire on the locomotive side.



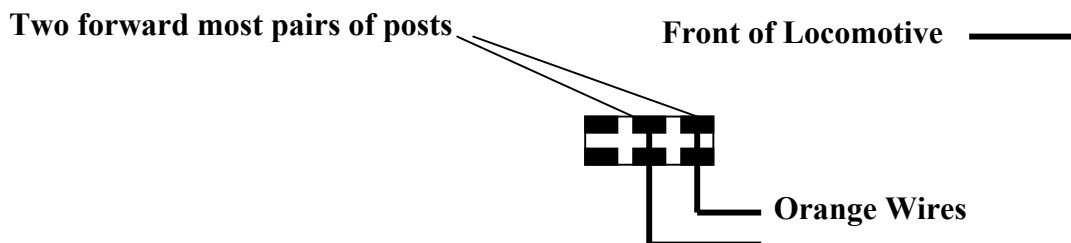
Overhead view of the inside of a typical steam locomotive

Wiring the Rear Protocoupler

Your locomotive may or may not already have a coil coupler. If it does not have a coil coupler and you would like to add one, you can. Simply give us a call. If the engine is already equipped with a coil coupler you will need to connect it to the UCUB II. The original coil coupler wires have a blue connector on the end. Simply clip this connector off and connect the wires to the two White wires on the top of the UCUB II. If your locomotive is not equipped with a front coil coupler carefully clip the two Blue wires off the UCUB II, as they will not be used. If your locomotive does not have a rear coil coupler and you do not plan on adding one, clip the two white wires off the top of the UCUB II. Once the coil coupler wires are connected proceed to the next step.

Installing the Program/Run Switch

You will notice the switch connected to two orange wires on the UCUB II. Locate a position on the frame to mount this switch with the two small screws and nuts provided. When mounting the switch we recommend you orient the switch so the two wires are towards the front of the tender frame and the single unsoldered post is towards the rear coupler. This is a common practice we are trying to adopt in all command control conversions. The illustration below shows what we mean.



Removing All Unnecessary Wires

At this point you should clip the following wires off the UCUB II;

- 1.) The single Blue wire soldered to the BOTTOM of the UCUB II
- 2.) The single Green wire soldered to the BOTTOM of the UCUB II.
- 3.) The two BLUE wires for the front coupler (if your locomotive does not have a front coil coupler).

- 4.) The RED wire on the UCUB II if you are not using a 1-pin tether to control the smoke unit.

Reinstalling the Protosounds

Locate the top Protosounds board you removed at the beginning of the installation. Referring to the diagram on the last page, carefully plug the Protosounds board into the UCUB II. DO NOT install the Protosounds board backwards, as permanent damage will occur to the soundboard. Once you have plugged the Protosounds board into the UCUB II wrap a piece of electrical tape around the two boards to ensure they don't separate over time.

Take notice to the yellow capacitor on the bottom of the Protosounds board. This small capacitor will keep the soundboard far enough away from the R2LC to prevent any shorts from occurring. The diagram on the last page illustrates this, please refer to it for clarity.

Once the Protosounds board is in place locate the 2-position speaker plug and the 3-position volume pot plug. Plug these connectors back into their respective 2-pin and 3-pin connectors on the top soundboard with the metal wire crimps (seen through the black connectors) facing upwards.

Quick Test

We highly recommend you refer to page 22 to perform a quick test of your installation. This will allow you to see the locomotive function prior to trying to isolate the shell. Isolating the shell can sometimes be tricky, and if upon your first try we don't want you to get discouraged. So please test the loco before proceeding.

Tender Frame Preparation

Chances are your tender shell is made of either die cast metal or brass. In either case you will be required to electrically isolate the tender shell from the tender frame. This is done so the tender shell becomes the antenna, which will receive the signal that is transmitted from the command base. Before you reinstall the shell you will need to apply electrical tape to the perimeter of the tender frame (we highly recommend using black electrical tape for this). The electrical tape should drape over the edges of the frame, similar to a curtain. Please make certain there is electrical tape wherever the shell makes contact with the frame. (The tape will be cut once the shell is in place, so please don't overreact to the draping.) Keep in mind that sharp corners may require additional tape to reduce the risk of the tape tearing. Once you have completely covered all the areas where the shell comes in contact with the frame move on to the next step. ***NOTE: You may want to round any sharp edges using a small jewelers file. A round corner greatly reduces the risk of the tape tearing.***

Reinstalling the Shell

Locate the Green and Yellow 2-position plugs that make up the rear light and marker lights. (Green is rear light and Yellow is marker lights.) Plug the Green plug into the Green connector on the bottom of the UCUB II. Plug the Yellow connector into the Yellow plug on the topside of the UCUB II (the same side the Protosounds board is on). Once you have plugged the Yellow and Green connectors into the UCUB II you are ready to reinstall the shell.

Set the tender shell next to the frame, up side down. Remove the paper backing from the copper foil antenna. Before you adhere the antenna to the inside center roof of the tender make sure you can see shiny metal or brass (simply scrape the paint away). Once you have a clean shiny surface apply the antenna to the inside roof of the tender shell. Cover the copper antenna with electrical tape to prevent any shorts from occurring if the antenna should ever fall off the roof.

Now carefully flip the tender shell on top of the frame and GENTLY press the two pieces together. (Make sure the 4-pin and 1-pin tether are aligned with the small hole in the front of the tender shell, if they

are not the shell will not fit properly on the frame.) Once you have placed the shell on top of the frame and the shell is seated properly you need to perform a quick test to ensure the tape did not tear. To perform this test place the locomotive on the track, ensure the program/run switch is in the run position. With the Command Base connected to the outside rails apply 18 VAC to the track. The sounds will make 2 dings and start the startup sound sequence. Using the Cab-1 remote address Eng 1 and turn the throttle clockwise until the locomotive begins moving. While the locomotive is moving blow the whistle, ring the bell, etc. If the engine responds to all the commands you sent it the tape has not torn. If the engine does not respond to all your commands the tape has obviously torn and the shell is making contact with the frame, so you will need to remove the shell and replace the electrical tape around the perimeter of the frame. Once you have replaced the tape re-perform this test to verify the tape has not torn.

***NOTE** This process of applying tape and testing to verify the tape has not torn may take two or three tries. This is by far the most difficult aspect of this installation. Your patience will be tested. If you get frustrated with this process set the locomotive aside and walk away. Performing this process while you are mad only makes the process much harder, believe us, we know. A little patience will go a long way for this step.*

Once you have determined the tape has not torn it is time to install the nylon screws in place of the original metal screws. Only install the nylon screws in the four corners of the shell, do not attempt to install the screws located midway between the four corners (even if the holes tempt you to). After you have installed the nylon screws repeat the test procedure mentioned above to verify once again the tape has not torn. If the tape has not torn after completing this test proceed to the instructions on page ____ for testing the overall operation of the locomotive. If the tape has torn, and the locomotive does not respond to Cab-1 commands, you need to remove the screws and re-insulate the frame.

Railking Steam Locomotive Installation

Removing the original electronics

Begin the installation by removing the screws that hold the tender shell to the tender frame. Remove the tender shell and set it aside.

You will now see the original electronics package. Some locomotives have the electronics mounted flat, while others have them mounted on their side. Regardless of how your particular locomotive electronics are mounted, the same instructions apply.

Locate and remove the only white battery connector on the top of the bottom reverse unit. (Refer to the diagram on the last page for clarity.) This white connector will have a red and black wire in it and makes up the battery harness. Unplug the battery harness from the DCRU so no damage occurs to the sound system when you remove it. It is up to you whether or not you want to leave the battery in the tender or remove it altogether (the battery is NOT used with the UCUB II). If you decide to remove the battery do so now.

You will see the top Protosounds board, which will have a 2-position (speaker plug) and 3-position (potentiometer, volume plug) plugged into the top on one end of the top soundboard. Carefully remove these plugs from their connectors by sliding them off their respective pins. Notice that you can see the metal crimps on the ends of the wire through the connectors. Please keep this orientation in mind when reinstalling these connectors. (If you get them up side down no damage will occur, but the potentiometer (volume control) will be backwards from the way it is now.)

Locate the electrical tape or 2 plastic brackets that hold the two boards together. Either cut the electrical tape or remove the plastic bracket and set them aside. Carefully grab the short ends of the top Protosounds board and gently rock it back and forth from end to end while applying gentle upward pressure. Once the soundboard is free from the two 8-pin female connectors set it aside.

You can now clearly see the bottom DCRU (reverse unit). Carefully locate the Phillips head screw that holds one end of the DCRU in place (this screw passes through the square bridge rectifier on the end of the DCRU closest to the large rectangular relays). Remove this screw and keep it nearby. Now locate the small screw that holds the voltage regulator in place. This screw will have a nylon shoulder washer on it (the diagram on the last page illustrates the location of these screws). Remove the small screw holding the voltage regulator in place and keep it nearby. Both of these screws will be required to mount the UCUB II to the tender frame.

The DCRU should be free from its mounting position. Carefully unplug the Red, Black, Yellow and White connectors from the underside of the DCRU. These wires make up the tether that goes between the locomotive and tender. If your tender is equipped with a coil coupler, unplug the blue 4-position connector located at the extreme rear of the DCRU. Set the DCRU aside once you have unplugged the connectors and removed it from the frame.

Installing the UCUB II

The UCUB II will mount in the same exact position as the original DCRU. Before you reinstall the UCUB II on the tender frame plug in all the tether connectors. The UCUB II plugs are color-coded. Plug the Red connector to the red plug, the Black connector to the black plug, White to white (the White connector is not painted) and Yellow to yellow. All the tether connectors plug into the color-coded plugs on the bottom of the UCUB II. Once you have the connectors plugged in set the UCUB II in place. Using the original long screw you removed from the DCRU insert it through the frame or mounting bracket (the same way you took it out). Locate the small 4-40 nut (enclosed in a plastic baggie) and twist it on the screw you just inserted. Tighten the nut so the UCUB II is firmly held in place. Locate the small screw you removed from the DCRU voltage regulator (the nylon shoulder washer is not required for the UCUB II, neither is the clear plastic insulator). Screw the UCUB II voltage regulator into the same mounting position the DCRU regulator was in. If the UCUB II looks slightly off level it is okay, it will not affect the performance of the UCUB II.

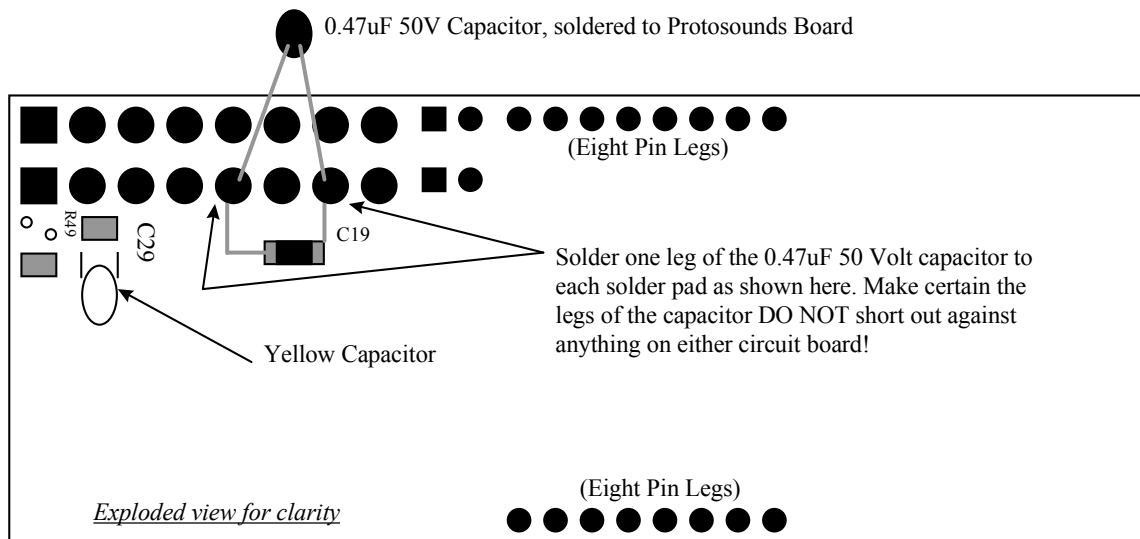
At this point you should have the UCUB II mounted on the tender frame. The 4-pin tether should be connected to the bottom side of the UCUB II. If this is not what your tender frame looks like, please backtrack through the above installation instructions to catch up.

Steam Protosounds Preparation

If your locomotive is equipped with MTH Steam Protosounds you will need to make a small modification, which will require soldering. The original Protosounds system applied voltage to the motors at approximately 5 volts on the track (this is the voltage that each transformer applies when you turn on the throttle from the power off position). As a result the Protosounds soundboard does not chuff properly when coupled to the UCUB II (this is because the UCUB II applies motor voltage between zero and five volts). The method we use to correct the Protosounds chuff gap problem is to add a small capacitor to their chuff input circuit. The capacitor is included with your kit and located in a clear plastic baggie.

The photo below illustrates exactly where this capacitor is added. Please take a great deal of care when soldering this component to your Protosounds board. Please ensure that the capacitor DOES NOT touch any other components on the soundboard, otherwise you may permanently damage your Protosounds board.

If you are uncomfortable soldering this component to your soundboard we can do it for you, free of charge. Simply send your Protosounds soundboard to us along with your capacitor and return shipping address. We'll add the capacitor and mail it right back to you the same day.

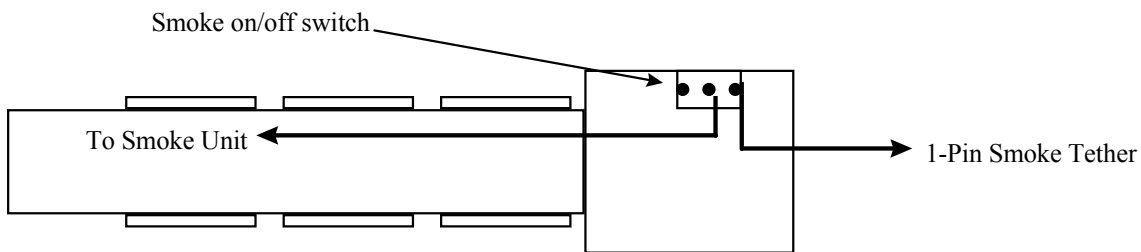


Bottom View of Protosounds Board

Wiring the Protosmoke Unit

If you want to control your smoke unit from the Cab-1 remote you will need to install a 1-pin tether between the UCUB II in the tender and the smoke on/off switch in the locomotive. This tether is available for \$2.00 and can be ordered from TASTudios directly or through your dealer.

Install the female end of the tether to the red wire on the UCUB II. Install the male end of the wire to the smoke on/off switch inside your locomotive. (You will need to remove the locomotive shell, locate the smoke on/off switch and identify which wire is connected to the smoke unit and which wire is connected to the center rail pickup rollers. The male end of the 1-pin tether replaces the center rail pickup wire on the switch. After you have soldered the 1-pin tether in place you can reattach the locomotive shell. Please take care in routing the 1-pin tether out the back of the locomotive, make sure it does not short out against the frame and/or shell.) Be sure to leave enough wire sticking out from both the tender and locomotive. If the wire is too short it may come unplugged on tight curves. The diagram below illustrates the location of the 1-pin tether on the locomotive.



Overhead view of the inside of a typical steam locomotive

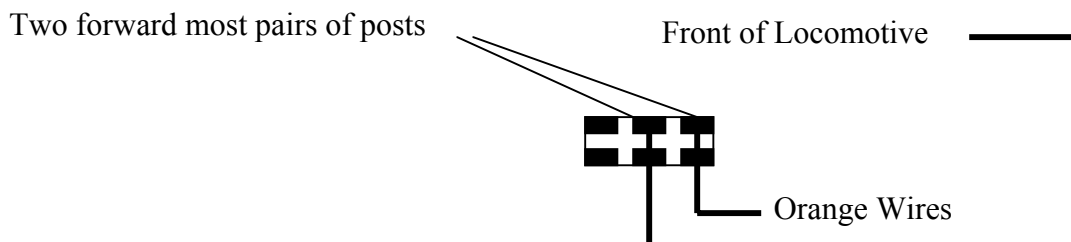
Wiring the Rear Protocoupler

Your locomotive may or may not already have a coil coupler. If it does not have a coil coupler and you would like to add one, you can. Simply give us a call. If the engine is already equipped with a coil coupler you will need to connect it to the UCUB II. The original coil coupler wires have a blue connector on the end. Simply clip this connector off and connect the wires to the two White wires on the top of the UCUB II. If your locomotive is not equipped with a front coil coupler carefully clip the two Blue wires off the UCUB II, as they will not be used. If your locomotive does not have a rear coil coupler and you do not plan

on adding one go ahead and clip the two white wires off the top of the UCUB II. Once the coil coupler wires are connected proceed to the next step.

Installing the Program/Run Switch

You will notice the switch connected to two orange wires on the UCUB II. Locate a position on the frame to mount this switch with the two small screws and nuts provided. When mounting the switch we recommend you orient the switch so the two wires are towards the front of the tender frame and the single unsoldered post is towards the rear coupler. This is a common practice we are trying to adopt in all command control conversions. The illustration below shows what we mean.



Removing All Unnecessary Wires

At this point you should clip the following wires off the UCUB II;

- 1.) The single Blue wire soldered to the BOTTOM of the UCUB II
- 2.) The single Green wire soldered to the BOTTOM of the UCUB II.
- 3.) The Red wire on the Top of the UCUB II (if you are not adding a 1-pin tether for smoke control).

Reinstalling the Protosounds

Locate the top Protosounds board you removed at the beginning of the installation. Referring to the diagram on the last page, carefully plug the Protosounds board into the UCUB II. DO NOT install the Protosounds board backwards, as permanent damage will occur to the soundboard. Once you have plugged the Protosounds board into the UCUB II wrap a piece of electrical tape around the two boards to ensure they don't separate over time.

Take notice to the yellow capacitor on the bottom of the Protosounds board. This small capacitor will keep the soundboard far enough away from the R2LC to prevent any shorts from occurring. The diagram on the last page illustrates this, please refer to it for clarity.

Once the Protosounds board is in place locate the 2-position speaker plug and the 3-position volume pot plug. Plug these connectors back into their respective 2-pin and 3-pin connectors on the top soundboard with the metal wire crimps (seen through the black connectors) facing upwards.

Quick Test

We highly recommend you refer to page 22 to perform a quick test of your installation. This will allow you to see the locomotive function prior to trying to isolate the shell. Isolating the shell can sometimes be tricky, and if upon your first try we don't want you to get discouraged. So please test the loco before proceeding.

Tender Frame Preparation

Chances are your tender shell is made of either die cast metal or brass. In either case you will be required to electrically isolate the tender shell from the tender frame. This is done so the tender shell becomes the antenna, which will receive the signal that is transmitted from the command base. Before you

reinstall the shell you will need to apply electrical tape to the perimeter of the tender frame (we highly recommend using black electrical tape for this). The electrical tape should drape over the edges of the frame, similar to a curtain. Please make certain there is electrical tape wherever the shell makes contact with the frame. (The tape will be cut once the shell is in place, so please don't overreact to the draping.)

NOTE: Sharp corners require additional tape. It is a good idea to use a small jewelers file to round off any sharp corners to greatly reduce the risk of tearing the tape.

Once you have completely covered all the areas where the shell comes in contact with the frame move on to the next step.

Reinstalling the Shell

Set the tender shell next to the frame, up side down. Remove the paper backing from the copper foil antenna. Before you adhere the antenna to the inside center roof of the tender make sure you can see shiny metal or brass (simply scrape the paint away). Once you have a clean shiny surface apply the antenna to the inside roof of the tender shell. Cover the copper antenna with electrical tape to prevent any shorts from occurring if the antenna should ever fall off the roof.

Now carefully flip the tender shell on top of the frame and GENTLY press the two pieces together. (Make sure the 4-pin tether and the 1-pin tether are aligned with the small hole in the front of the tender shell, if they are not the shell will not fit properly on the frame.) Once you have placed the shell on top of the frame and the shell is seated properly you need to perform a quick test to ensure the tape did not tear. To perform this test place the locomotive on the track, ensure the program/run switch is in the run position. With the Command Base connected to the outside rails apply 18 VAC to the track. The sounds will make 2 dings and start the startup sound sequence. Using the Cab-1 remote address Eng 1 and turn the throttle clockwise until the locomotive begins moving. While the locomotive is moving blow the whistle, ring the bell, etc. If the engine responds to all the commands you sent it the tape has not torn. If the engine does not respond to all your commands the tape has obviously torn, so you will need to remove the shell and replace the electrical tape around the perimeter of the frame. Once you have replaced the tape re-perform this test to verify the tape has not torn.

NOTE This process of applying tape and testing to verify the tape has not torn may take two or three tries. This is by far the most difficult aspect of this installation. Your patience will be tested. If you get frustrated with this process set the locomotive aside and walk away. Performing this process while you are mad only makes the process much harder, believe us, we know. A little patience will go a long way for this step.

Once you have determined the tape has not torn it is time to install the nylon screws in place of the original metal screws. Only install the nylon screws in the four corners of the shell, do not attempt to install the screws located midway between the four corners. After you have installed the nylon screws repeat the test procedure mentioned above to verify once again the tape has not torn. If the tape has not torn after completing this test proceed to the instructions below for testing the overall operation of the locomotive. If the tape has torn you need to remove the screws and re-insulate the frame.

Once you tested your locomotive with the shell on and have completed the testing segment as shown on page 22 your installation is complete. Congratulations, we hope you have a lot of fun with your new command controlled MTH locomotive.

Testing the UCUB II Installation with Protosounds 1

Now that your UCUB II board is installed in the locomotive it is time to test it. Before you run the locomotive you will want to program the ID number. For testing purposes we prefer to use the address of 1. Locate the program/run switch (This is what used to be the coupler selector switch on diesels. For steam it is the switch you recently installed.) Slide the switch to program (towards the front of the locomotive). Place the locomotive on the track. With the Lionel command base plugged in and connected to the outside rails apply power to the track until you reach 18 volts. (The sound system will sound 2 dings and immediately go through the start up sounds.) With the Cab-1 remote press the following keys;

ENG + 1 + Set (located under the cover below the red throttle wheel). The sound system will ding (the front light on diesels will flicker when the set button is pressed).

Now press the following keys;

ENG + 1 + AUX1 + 8 the sound system will ding again. (The front light on diesels will flicker when the set button is pressed.) This programming step makes the command receiver set for a smoke unit to control the on/off from the Cab-1.

Turn the power off and slide the program/run switch back to run (towards the rear of the locomotive). Set the locomotive back on the track and apply 18 volts AC. (The sound system should play 2 dings and commence the start up sounds.) Wait approx. 8 seconds for the start up sounds to end and the idle sounds to begin. DO NOT press the horn or bell keys! (The locomotive must begin moving (only upon initial power up) before you press these keys). Turn the Cab-1 throttle clockwise. The locomotive will begin moving forward. The sound system will also begin revving up or chuffing (you can press the horn and bell keys now). Stop the locomotive using the red throttle on the Cab-1 (counterclockwise). The sound system will reenter the neutral sound mode.

If you followed step 2 in the programming instructions the horn or whistle will blow when you press the horn/whist key on the Cab-1. If you did not follow step 2 then the coupler arming and firing sound will play, but the couplers will not be affected.

Steam locomotives will begin chuffing a few seconds after the throttle is turned. This is due to the capacitor you added to the soundboard. This capacitor needs to charge up before it kicks in. This is normal and can be prevented by turning the throttle just slightly, so voltage is applied to the motors, but the train isn't moving. Wait 2-3 seconds before turning the throttle more to increase speed. The sounds will begin chuffing immediately at this point.

While you are performing this test verify the headlights are functioning correctly, operating directionally that is. Also check the marker lights if so equipped. If the locomotive is equipped with a smoke unit press the following keys on the Cab-1; ENG + 1 + AUX1 + 9. This will turn the smoke unit on. If, after pressing these keys, the smoke unit does not start check the smoke on/off switch and verify that it is in the on position. To turn the smoke unit off simply press ENG + 1 + AUX1 + 8. You can fire the couplers at any time using the F and R keys on the Cab-1. The couplers will fire, but no coupler sounds will be heard.

Once the locomotive is in neutral you can press and hold the bell button. Keep the bell button held down and listen for an air release sound. Once you hear the air release sound let off the bell button, wait a second or two and turn the bell off by pressing the bell key once again. The sound system is now armed for neutral sounds. Turn the throttle and get the locomotive moving forward or backward. When you are ready to play the neutral sounds turn the throttle down, but do not stop the locomotive. When you are ready for the

locomotive to stop press the DIR button. This will cause the squealing brakes to play and begin the first announcement. Once you are ready to toggle to the next announcement press the DIR key. When you are ready to go to the next announcement press the DIR key again. (You will hear 2 air release sounds and a person whistling (for freight) or a “Now departing on Track.....” (for passenger)). Once you hear these sounds press the DIR key once more. The sounds will begin the last phase of announcements. The bell will begin ringing but the train will not move unless you turn the throttle. The locomotive will begin moving in the direction it was heading when you stopped it.

There is a method behind the Direction button toggles. This method is as follows;

- 1.) The train is moving and the sounds are set for neutral sounds. Pressing the DIR key sets the train to go in reverse, but toggles the sounds to start their first announcement.
- 2.) By pressing the DIR key you toggle to phase 2 of the announcements. The train is set to move forward.
- 3.) Pressing the DIR key again moves the sounds to phase 3. The train is poised to move in reverse.
- 4.) The final DIR keystroke sets the sounds into phase 4, the final announcement mode. It sets the locomotive to start out in forward (the direction you were moving when you first pressed the DIR key).
- 5.) If these steps are not followed the locomotive may start out in the opposite direction in which it was stopped. This can be detected by looking at the headlights on diesels, as the lights are on in the direction the train will move. For steam engines this is only detectable by the rear light if so equipped.

Once you have verified the sound functions and lights are working properly you can assign the engine any ID number you like by repeating the steps in the beginning of this segment and substituting your one or two digit ID number in place of 1.

Standard Cab-1 Operating Features of a UCUB II

The following is a complete list of commands in which your UCUB II will respond to. If you have any questions, please feel free to contact us directly at (330)533-7181 Monday-Friday 10a-6p EST.

<u>Cab-1 Key</u>	<u>Function</u>
Horn	Horn or whistle will sound (not true at initial power up, the loco must first move before the horn key will trigger the horn or whistle).
Bell	Press once to start the bell sound, press it again to turn the bell off. Same rule Applies as the horn. No sounds until the loco begins moving. Also used to set The PFA/PSA sound sequence when the locomotive is in the idle position.
F & R	Activates the Front or Rear coil coupler (no sounds should be heard)
AUX2	Turns the headlights controlled by the UCUB II off. Press it again to turn them Back on.
BOOST	press and hold and the locomotive will increase in speed. Let off BOOST and The loco will return to the speed it was originally going.
BRAKE	Press and hold and the locomotive will slow down and eventually stop. Let Off the BRAKE key and the locomotive will return to its original speed. (This will

Toggle the sounds between running and neutral sounds if the loco stops completely.)

DIR Used to change direction, headlights on diesels are directional. The headlights can Tell which direction it is poised to move out in. Also used to toggle through PSA/PFA Announcements.

Throttle Used to increase and decrease locomotive speed. Clockwise increases speed, Counterclockwise decreases speed.

Troubleshooting

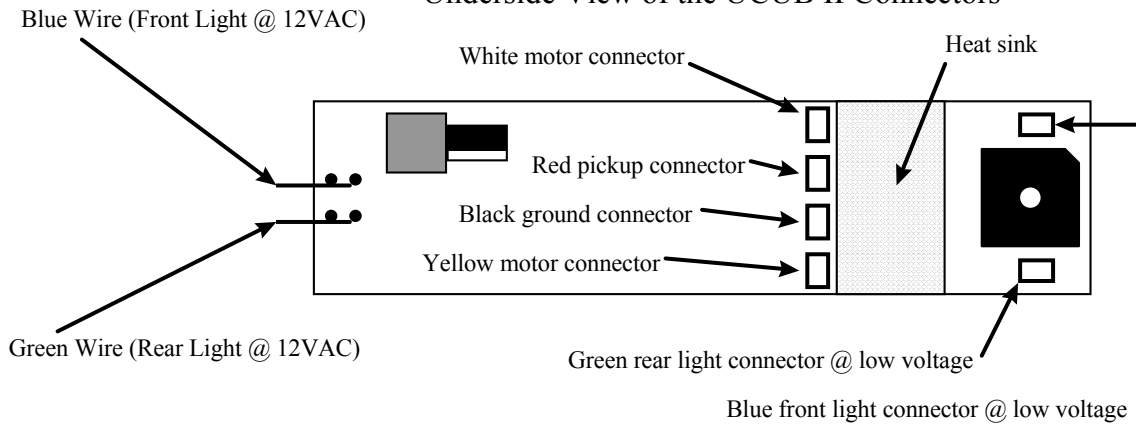
<u>Symptom</u>	<u>Solution</u>
No Sounds are heard	Was the potentiometer and speaker plugged back on the sound board? Was the Potentiometer plug installed up side down? If so, set the volume pot half way Between up and down and retest the sound volume.
Sound is very soft	Increase the volume pot clockwise to increase the volume. If the sounds get softer Turn the pot counterclockwise.
My headlights are very dim	Perhaps the headlights are 12 volt bulbs which need to be connected to the blue And green WIRES on the BOTTOM of the UCUB II and not the blue and green plugs.
My Smoke unit fan is pulsing	Refer to page 22 for programming the locomotive for a smoke unit. The R2LC (Command receiver) is set for a strobe light output and not a smoke unit on/off.
My train doesn't move	Are the color coded connectors plugged into the correct sockets? Please check Red to red, Black to black, Yellow to yellow and White to white. If any of these Are reversed the UCUB II will not operate properly.
My loco does not respond to commands	Is the antenna touching ground? Is the tender shell electrically isolated from ground? Is the antenna securely soldered to the UCUB II board? Is the antenna wire pinched between the shell and the frame.

If you encounter a problem that is not listed in this section please call TASTudios at 330-533-7181 Mon-Fri 10a-6p EST for technical assistance. You can also reach us by email at info@tastudios.com.

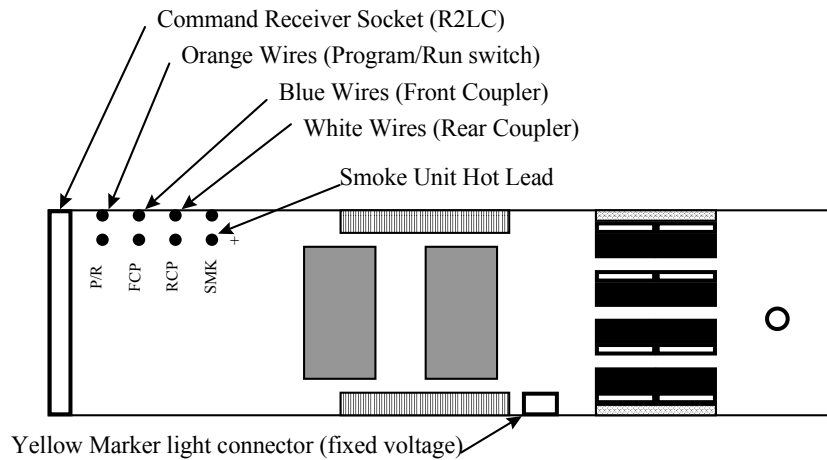
We encourage you to visit our website at www.tastudios.com for a complete listing of our exciting command control upgrades. Remember, TASTudios puts the FUN in your trains!

TRAIN AMERICA STUDIOS

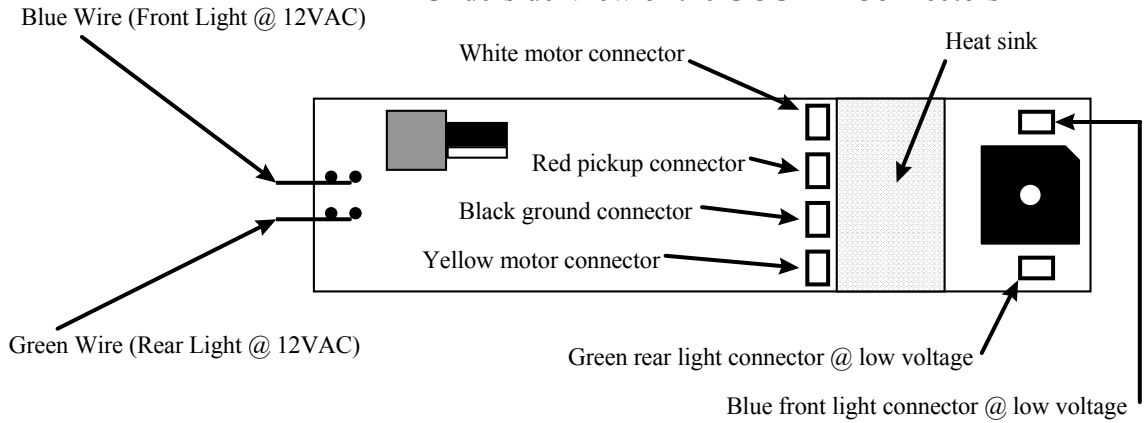
Underside View of the UCUB II Connectors



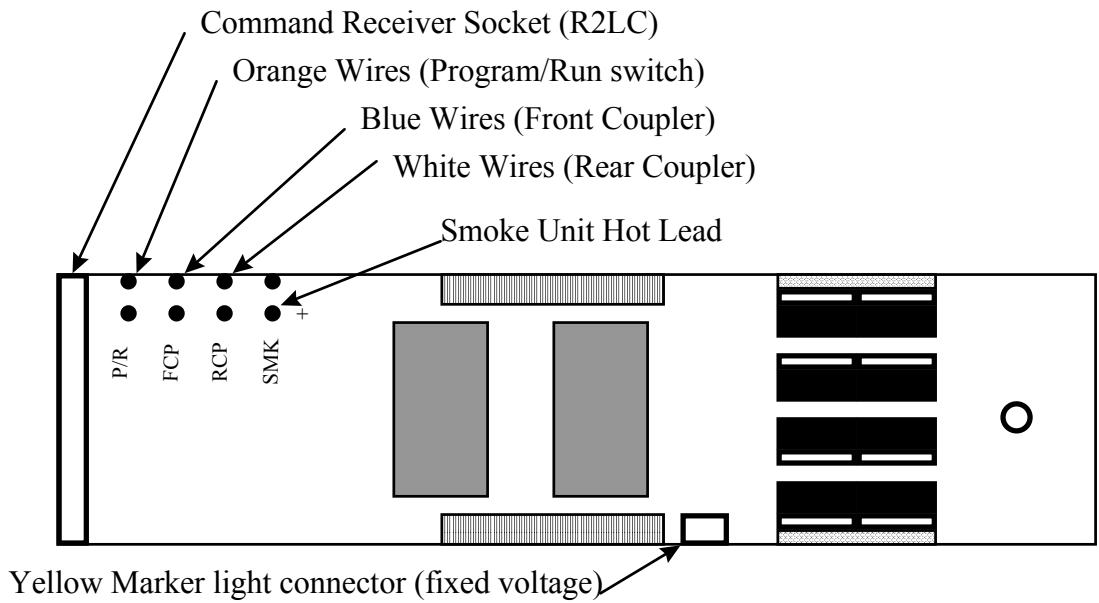
Overhead View of UCUB II Connectors



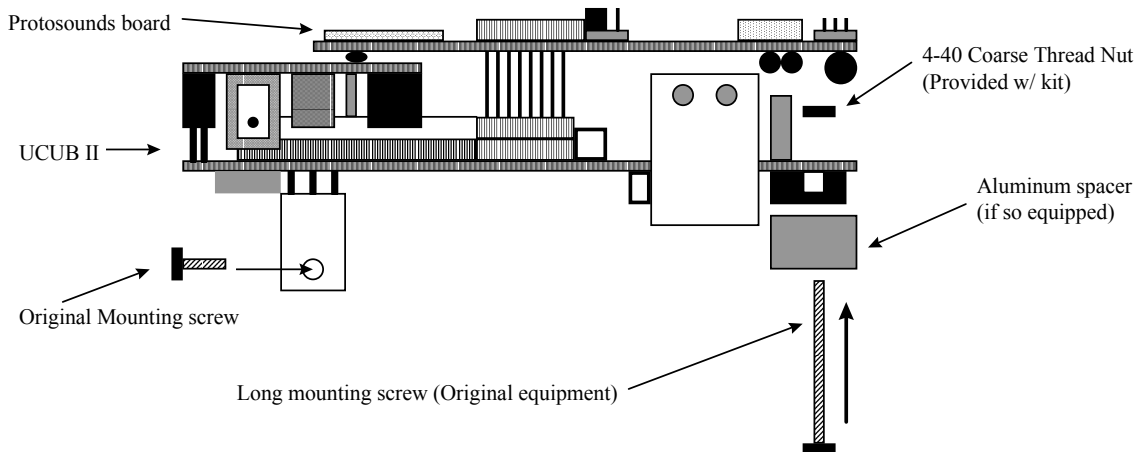
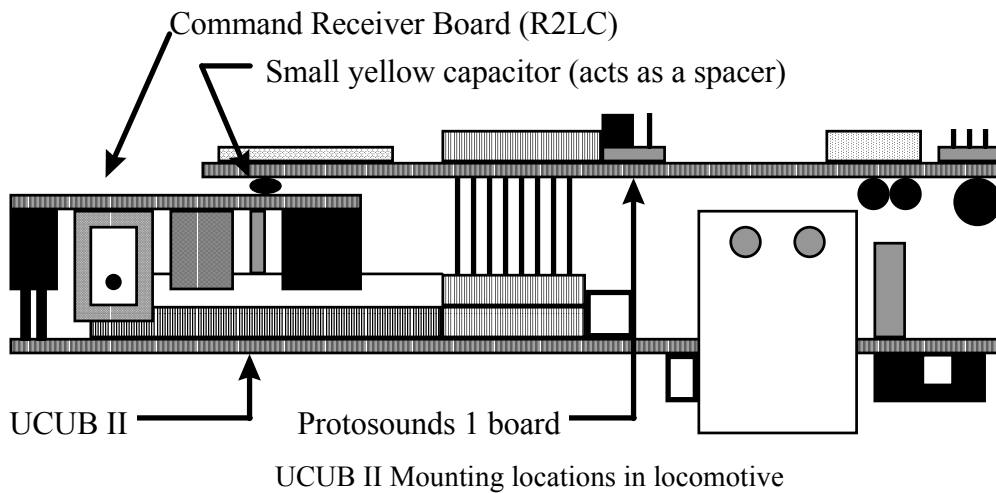
Underside View of the UCUB II Connectors



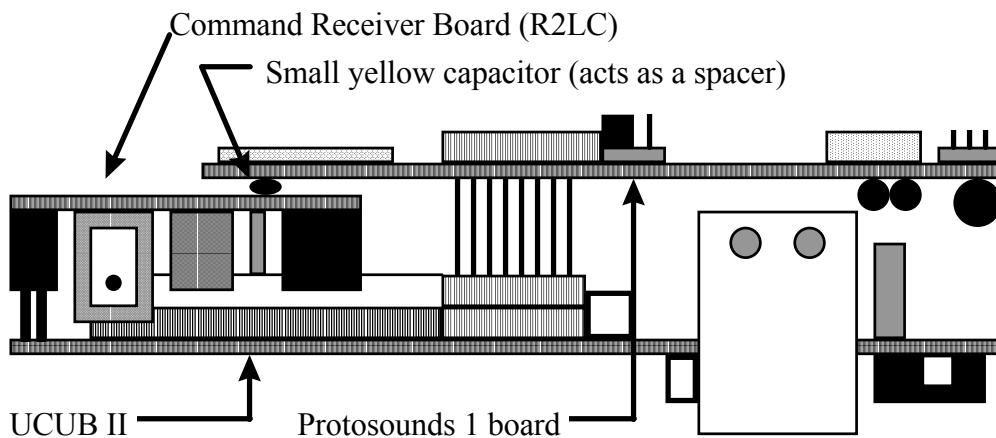
Overhead View of UCUB II Connectors

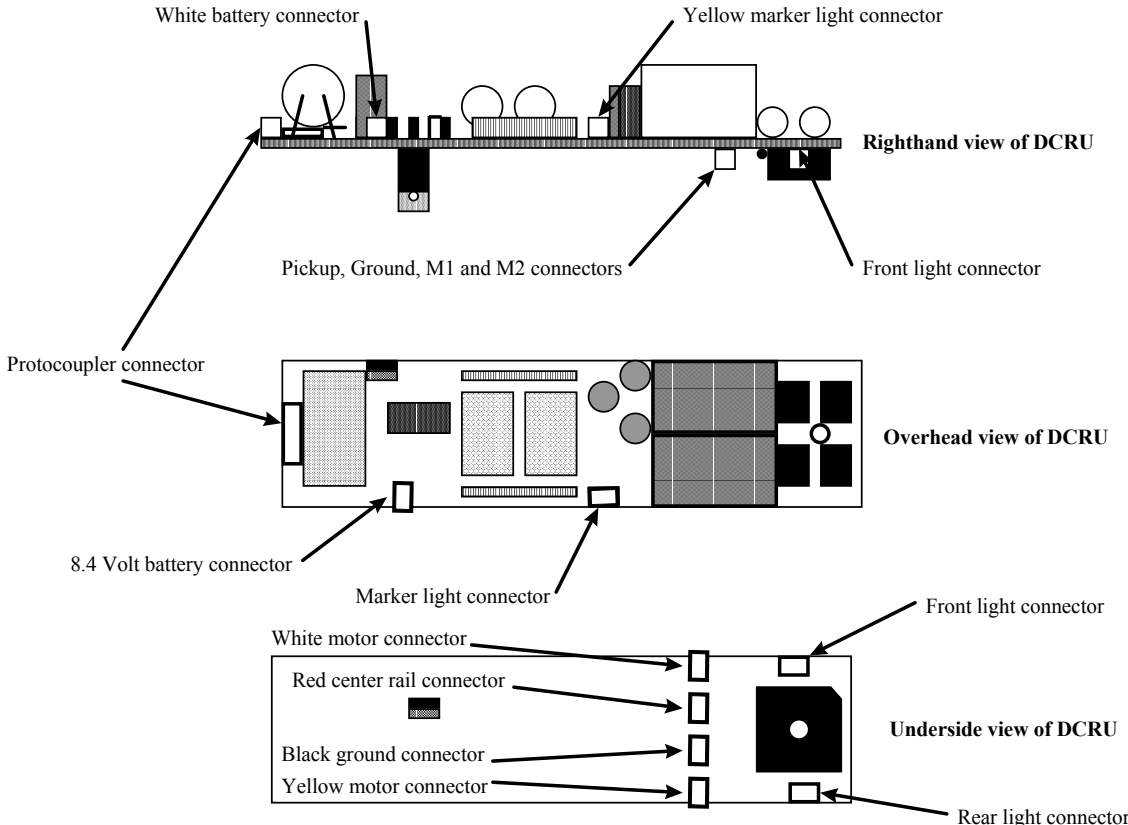


Orientation of Protosounds 1 in the UCUB II

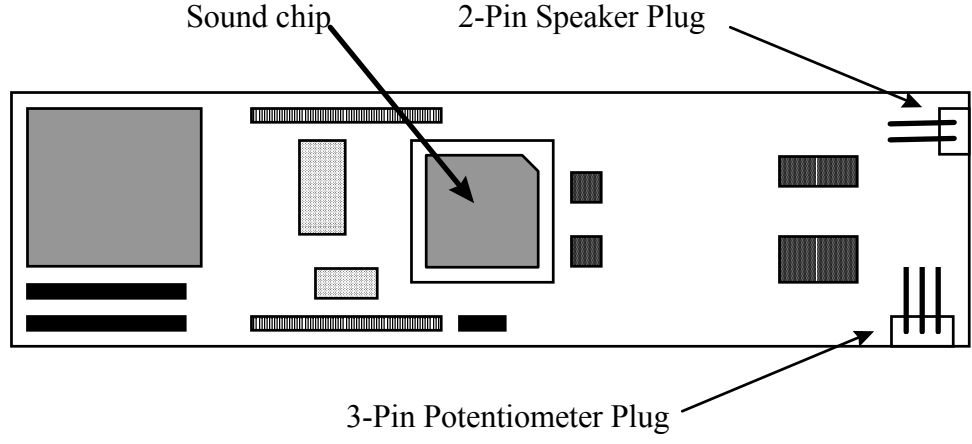


Orientation of Protosounds 1 in the UCUB II



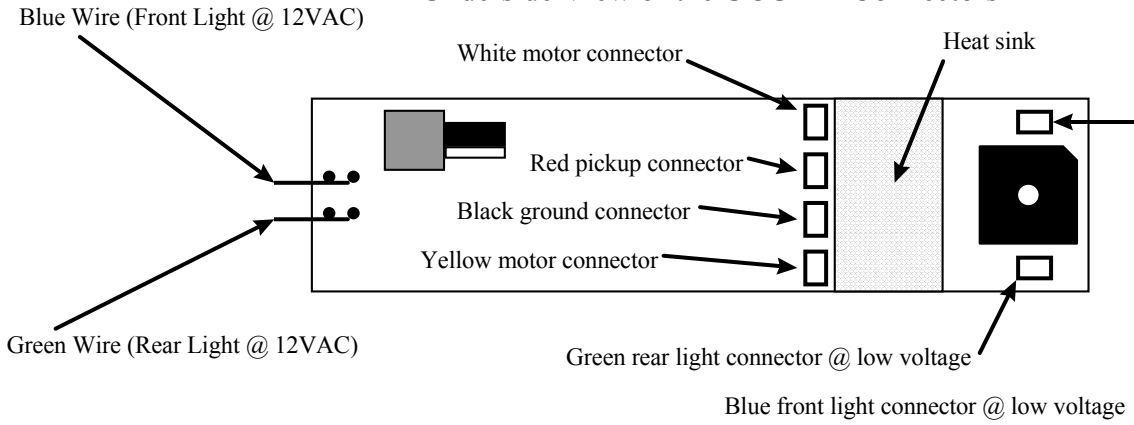


DCRU Connectors



Overhead View of Protosounds soundboard

Underside View of the UCUB II Connectors



Overhead View of UCUB II Connectors

