



## Digitrax DT602 Family Manual

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## 1.0 Introduction

Congratulations on your purchase of a Digitrax DT602 family throttle. The DT602 version is a LocoNet throttle with Digitrax IR untethered capability and the DT602D has the same capabilities with the addition of Digitrax Duplex tetherless operation. Both Duplex and IR operations are backwards-compatible with existing Digitrax command stations, layouts and UR92, UR90 devices.

There are other international versions of these two base throttles and this manual covers the complete family, since operations are consistent and similar. The exact model ID is shown on the label between the DT602 speed knobs.

To simplify operation the DT602 employs a color graphic LCD screen and a variety of cascading menus, up to six context-related soft keys and a built in context-related help system that prompts available actions, or information on the side-scrolling HELP line.

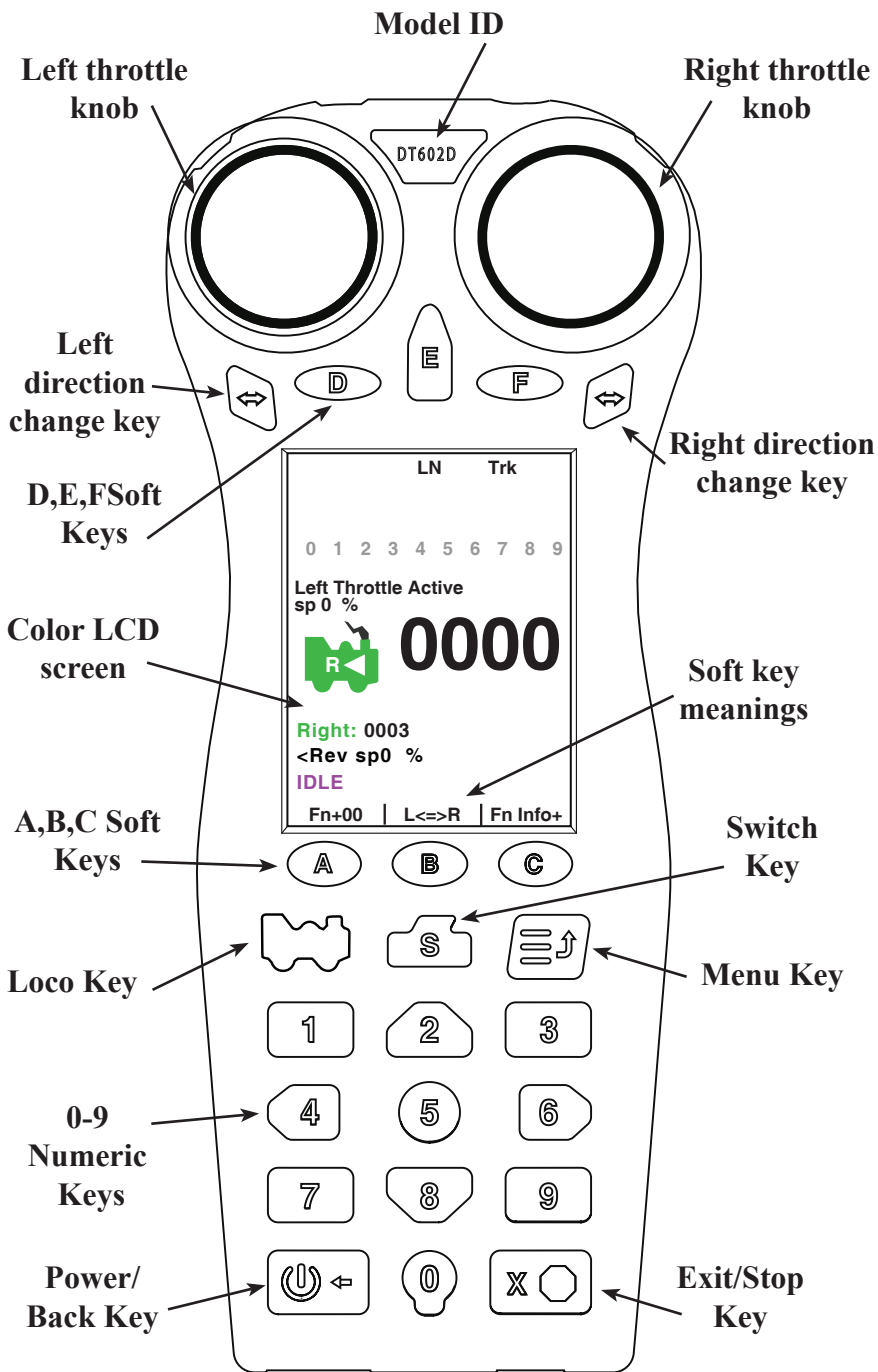
This context HELP system prompting, coupled with a color screen makes the DT602 easy to use and a powerful layout control throttle. You will not need to refer to a manual very often!

The DT602 throttle firmware can be downloaded and updated in the field using a PC running the free DigiPL app and connected to a suitable Digitrax command station. The DT602 functions and screens may change with updates from the Digitrax Web site, so be sure to check the DT602 product pages to get the latest information and .dmf download files.

The design of the Digitrax Complete Train Control<sup>®</sup> system lets you operate your layout the way you choose. With LocoNet<sup>®</sup> you simply connect system components to build the layout control system that you've always wanted! The Digitrax system reduces and simplifies layout wiring.

There are many different combinations of Digitrax components that can be used to set up a layout control system that is right for you. You can combine Digitrax products with compatible decoders, boosters and computer software made by other companies that build compatible equipment.

Your success with & enjoyment of our products are very important to us. After all, this is a hobby and it is FUN!!! Please read this manual carefully before installing your system. We have included lots of hints and operating ideas based on our experience. There is additional information on this product and its operation at the [www.digitrax.com](http://www.digitrax.com) website. If you have questions not covered by this manual please contact your dealer or visit our website at [www.digitrax.com](http://www.digitrax.com). The Digitrax on-line Tech Support Depot is always open, and support staff is ready to help on our Help Desk at: [helpdesk.digitrax.com](http://helpdesk.digitrax.com).











**Figure 1: DT602 family- keypad and LCD screen**

## 2.0 Quick Start Guide

This Quick Start Guide will have you running a train with your DT602 in about a minute! You will begin this process with an existing Digitrax command station connected to a layout or a test track.

Make sure that you take any analog (address 0000/non-decoder) locomotives off the track before you begin. Refer to Figure 1 for the DT602 throttle layout. Figure 2 shows an example of the color LCD and the typical HOME screen information display.

1. Power up your Digitrax Command Station as normal.
2. Plug the DT602 throttle into a LocoNet RJ12 type jack on your Digitrax Command Station or layout using the LocoNet cable provided with the DT602.
3. The DT602 will beep and flash-up a start screen that includes the big text “Welcome to DT602” and other information, and then log-on to LocoNet and revert to a normal HOME screen. The STATUS BAR will show the text “LN” to indicate connection via a LocoNet cable, and green “Trk” letters if the track power is ON. The DT602 does not need batteries when plugged into LocoNet.
4. Press the soft key  to select the throttle Left or Right side knob you wish to use. The display Loco Info Area will indicate the active or focus throttle knob status, and the other throttle knob information will be demoted below this. Press the; loco  key, then the 0  key and then the  key again.
5. The throttle display will now show address 0000 in big numbers mid-screen, and a green Locomotive symbol showing direction, and a current speed indication above this. The scrolling HELP prompt line above the A/B/C soft keys provides useful operating hints and information in context as you use the DT602, or if you get confused as to control actions possible.
6. Press the power  key, and above soft key  will show Trk\_ON or Trk\_OFF indicating the action that will happen *when* you press soft key  down. Press to toggle, until you see the track status led on the command station is lit, indicating the track is powered ON.
7. Twist the chosen knob right or left, and the speed % indication will change and the track status led should change color slightly. Press the direction change arrow key  below the chosen knob to reverse the direction of the Analog locomotive selected as address 0000.
8. With these simple steps you have made your first locomotive address selection with your DT602 family throttle. Place an analog loco on the tracks to now operate it on address 0000.

ENJOY running your trains!

The DT602 has two independent Left and Right throttles. At the HOME screen use the soft **B** key to choose the focus or display active throttle side you want to use. Put a locomotive on the tracks that has a known decoder address, simply restart at step 4 above, and enter the known decoder address to operate that locomotive. Note that the soft meanings will change as the screens and contexts change, and the current key control is indicated by the adjacent screen text.

The following sections provide additional information beyond the built in scrolling HELP prompts. Check the Digitrax Web site for the latest DT602 information. The DT602 software can be updated in the field and so the operating screens may change slightly over time.

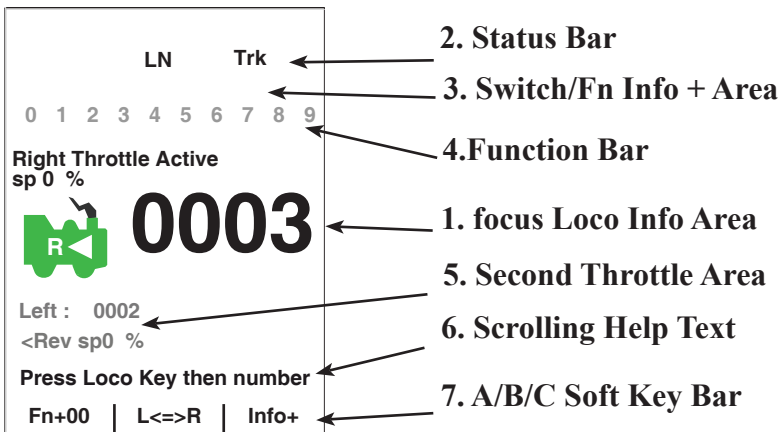
## 2.1 DT602 LCD screen

The DT602 **Display** is a 2.4 inch color LCD screen. The screen provides a variety of information and input prompts to assist in running locomotives and system setup. This section outlines the Home Operations Screen, other menu displays will be covered in following sections.

**NOTE:** The display is best viewed from directly above, viewing the screen at some angles may distort the perceived screen colors and actions.

### 2.1.1 Home Operations Screen






Figure 2 shows the primary or HOME operations screen for the DT602. This is the screen you will see most often when operating trains. The Home Operations Screen and it's items are shown below. This example is shown with a locomotive selected. If you ever get lost you can always quick press the **x** key to return to this Home screen. A long press will begin emergency stop.



**Figure 2: DT602 Home screen layout**

1. The **Loco Info Area** is where the current or *display focus* locomotive information for the active throttle knob is shown. Changing a knob speed, direction or the **B** key may change the throttle knob focus side. The focus loco's speed is then listed as "sp XX %". At left is a loco icon with the current direction indication. Showing forward as "F" and an arrow, or reverse, shown with or an "R" and arrow. If a focus loco is currently selected this loco icon will be *green* with flashing smoke above the smoke-stack. If no loco is selected the icon will be *gray* with no smoke. The currently active address is shown in the large numbers in the center. If a loco is selected the numbers will be solid *black*, if no loco is selected the numbers will be *gray*. The **focus Loco Info** area will show additional information during locomotive selection, see section 4.1 for more information on selecting locomotives.
2. The **Status Bar** is active for Home screen and will show the status of your system. There are multiple indicators that appear in the **Status Bar**. The "Ln" indicator is solid black when LocoNet is connected OK. The "Trk" indicator is green when system track power is turned on. In IR or Duplex mode connection information is shown.
3. The **Switch/Fn Info + Area** is where turnout or switch information is displayed in switch mode. Switch mode is covered in more detail in section 6.0. This area of the screen is also where the complete 29 function state is displayed when the "Info +" soft key is pressed. Active/ON function numbers are blue and inactive/OFF functions are grayed out. For more info on controlling and managing functions see section 5.0.
4. The **Function Bar** is where ten active locomotive decoder functions are shown. The compact function information shown in this bar correlates to the "Fn+" soft key, pressing the "Fn+" soft key will cycle through control of higher functions and display them in the **Function Bar**. For more information on using functions see section 5.0.
5. The **Second Throttle Area** shows information related to the alternate non-focus throttle knob that is not currently the function-number display and information focus.
6. **Scrolling Help** text line. Shows status and prompts user actions.
7. **A/B/C soft key Bar**. Indicates the adjacent soft key actions.

### 2.1.2 Screen IDLE Power saver

To save power and be ecologically responsive, the DT602 will enter a dark display screen IDLE after a user configurable no-activity timeout. When in a power saving IDLE mode the  key will flash green about every 3 seconds. To exit IDLE mode press the  or  key to restore the color LCD display. *A short press of the  key is a consistent way to return to the HOME screen from any menu.* **Note: holding the the  key for more than about 1 second will perform Emergency Stop. See section 8.0.**

### 3.0 Operating on batteries without LocoNet cable




All DT602 models can operate unplugged in IR tetherless mode if they detect Digitrax Infra-Red (IR) capability when first plugged into a working LocoNet. The DT602D can additionally operate in wireless Digitrax Duplex mode if it detects Duplex capability when first plugged into LocoNet.

To operate a tetherless mode you will need to install three AA size 1.5V batteries in correct orientation in the rear battery compartment. After disconnecting a battery powered DT602 from LocoNet, the throttle will enter the tetherless mode it and the LocoNet system is configured for.



The DT602D (Duplex) version can perform most of its tethered or plugged-in functions while it is untethered,. After initial plug-in to configure Duplex capability will automatically reconnect to the LocoNet system when disconnected or powered up again untethered.


Duplex mode active will show the Digitrax NetName in the STATUS line left-side in black text, along with the signal strength bars, Channel number and Battery level. If a Duplex message fails to get through the white LED will flash, and if layout Duplex support fails the NetName will change to red text.

### 3.1 Recharging a Digitrax BP600MH Battery pack

1. Remove the 3 AA batteries from the DT602 rear compartment and plug the 3 pin plug from an optional BP600MH battery pack into the matching socket. The yellow lead will be closest to the DT602 bottom edge. Form the wires to the compartment lower area and then replace the compartment lid with the battery and wires secure inside.
2. Plug in an external 10V to 18V DC supply (100mA minimum) with a 2mm center-positive plug into the charging socket at DT602 bottom edge.
3. Press the  key until you get the “Charge” text above  key, then press this key again
4. The DT602 will enter charge mode and typically automatically stop after about 14 hours. When in a charging IDLE mode the  key will flash red about every 3 seconds. Charge time depends on the battery history, like; residual charge, temperature and tolerances etc.

### 3.2 Powering a DT602 OFF

To power OFF a DT602 that is *untethered* before the normal inactivity power OFF timeout, press the  key and then the soft  key to power OFF completely.

In this state the DT602 will draw no battery power, and can be re-powered by simply pressing the  key again. The DT602 will not power down when on an active LocoNet or plugged into DC for charging.






## 4.0 How to select Locomotives and run trains

Each decoder receives a unique address. To select a decoder equipped locomotive and run it on your throttle, you must know it's address. Digitrax decoders are set up at the factory with the "default" address "03". This means that when you take a Digitrax decoder out of the package and install it in your loco, you can select address "03" on your throttle and run the decoder.

If you do not know the address of a decoder equipped locomotive, you can program a new decoder address and select it to run using this address, or use the DT602 and system programming track to read back the decoder address. *See Section 7.2 for details on address and CV programming.*

### 4.1 How to select a Locomotive address


1. In order to select a locomotive you need to know it's address and place it on powered layout track..
2. Press the  key once to enter loco selection mode, the large numbers in the Loco Info Area will begin to blink alternating black and gray. The soft keys will also change to give you new choice; "MU", "Recall" and "MORE". Pressing "MORE" will bring up "Disptch" "Stat. Edit" and "MORE" as soft key choices. Pressing "MORE" again will return to the previous soft key choices. These soft keys will be covered in the following sections.
3. Enter the address number of the locomotive you want to select. The text above the address number will provide you additional information about the loco address number you are selecting. If it says "free" the locomotive is available for selection. If it says "busy" the locomotive is in-use on another throttle, to select it you must complete the Steal process. The second set of numbers, usually "128" specifies the number of speed steps associated with the address. See Status Editing, Section 4.7 for more details.
4. If there is "cn", "mid", or "top" the locomotive is part of an MU/consist, see section 4.8 regarding consisting. Soft key  as "Sel Top" will appear if the address has a link up in an MU. Press this key to *find then select* the TOP loco address to control the whole consist speed and direction.
5. Once you have entered the address, press the  key again. The entered address number will go steady black and you will have control of the locomotive. Make sure that **Track Power** is turned on. The **Track Status Indicator** should be lit.
6. Turn the **Throttle Knob** to now run your Locomotive. Change direction with the direction key under the speed knob. You can also "double click" down quickly on the throttle knob to change direction.


## 4.2 Selecting an Analog or non-decoder locomotive

A locomotive without a DCC decoder is called an Analog locomotive and is run on address 0000. While an analog locomotive, with no decoder, is sitting still on your digital layout, you will hear a “singing” sound. Once the analog locomotive is moving, this sound will change and be less noticeable. To avoid heat build up in your locos without decoders, Digitrax recommends that analog locos **NOT** be left sitting on DCC powered track for long periods of time when they are not running.

As with a regular DC system, only one analog locomotive can be controlled at a time. If you run more than one analog locomotive at the same time on the layout all of the analog locos will respond to the commands sent to address “0000”.

## 4.3 Select a prior address using RECALL soft key

In loco selection mode when the  key shows “Recall”, pressing this key will bring up the non-volatile list of the last 10 unique addresses used on this DT602





When in Recall Session Loco List screen, pressing a 0-9 numeric key with a 4-digit address to the right will enter that number as the selection address. For example if you press the 6 key for the recall screen shown to the right, then the address 1000 will be entered as the recall selection address. The selection screen will go back with this number and pressing  will complete the selection of address 1000.

### Recall Session Loco List:

0- 0003  
1- 0069  
2- 0009  
3- 0085  
4- 0045  
5- 0065  
6- 1000  
7- 0026  
8- 0006  
9-

## 4.4 Releasing an address from a throttle

When you are finished running a locomotive address, it is best practice to release it from your throttle, so that it is available for other throttles to select and run.




1. Use the **Throttle Knob** to make the locomotive’s speed zero (this optional step is strongly recommended as the loco will continue to move after released if speed is not zero).
2. Press the  key to go into locomotive select mode.
3. The address will begin to blink in the display. Press the  key, this will release the address from both the DT602 and the locomotive stack in the system. The display on your DT602 will show the previously selected address grayed out.
4. If you press the  key again, the DT602 will begin flashing the address you just released. You can re-select that address by pressing the  key or you can enter a new address number to select.

## 4.5 How to Dispatch Locomotives

Dispatching is a special feature incorporated in the LocoNet system to meet the needs of operators that wish to enforce a strict discipline in how operators gain access to locomotives during an operating session. Dispatching also lets you run consists with basic throttles that can't set up their own consists and run four digit addresses on basic throttles that only have two digit capability. It lets you have newcomers run trains on the layout without giving them access to the entire operation.

When you dispatch a locomotive address or consist to your LocoNet system, you make it available to be acquired by another throttle. Only one address at a time can be marked as a dispatched address in the system.

### To dispatch a locomotive address using a the DT602

1. Press the  key to enter address selection, enter the address you want to dispatch.
2. Press the  key marked "MORE" to bring up additional address selection soft keys. Pressing more will bring up "Disptch", "Stat.Edit" and "MORE" as soft key options.
3. Press the  key now marked "Disptch" to dispatch the entered Loco Address.



The dispatched address can be a single locomotive address, either two digit or four digit, or a consist/MU that was set up by the DT602. The TOP locomotive in a consist or MU can be dispatched to transfer control of the entire consist to another throttle.

## 4.6 How to Steal Locomotives, forcing selection

If you try to select a loco address that is already selected on another throttle the DT602 will display "adr-busy" in red above the address in the Loco Info area of the display when the address is entered.

This is a safety interlock to prevent operators from taking control of locos that are already selected on other throttles. Occasionally it is necessary to override this interlock to gain control of a loco that is "lost" for whatever reason. This override is called "stealing a locomotive". When stealing with the DT602 it is then possible to have an address selected on more than one throttle on your system.



### To steal an address with the DT602:

1. Press  to enter selection mode.
2. Enter the address of the loco you want to steal and press  again.
3. A scrolling message will appear in the Scrolling Help Text Area reading "Press YES to steal Loco, No to exit" and the lower soft keys will change to "YES" and "NO" choices.

4. To steal the loco address press **A** key marked “YES”, to cancel the selection press **B** key marked “NO”.

## 4.7 Status Edit, changing speed step settings

### To Change the Speed Step Settings for a Decoder:

1. Select the loco address you want to status edit.
2. Press  once to enter loco selection mode, the large numbers in the Loco Info Area will begin to blink black and gray. The soft keys will also change to give you the options “MU”, “Recall” and “MORE”.
3. Press the **C** key labeled “MORE”: This will bring up the additional loco selection tasks of “Disptch” and “Stat.Edit” above the **A and B Soft Keys**.
4. Press the **B** key below “Stat.Edit” text. The Status Edit Loco# menu will appear and display the available speed step settings.
5. Press the number on the keypad to select the corresponding speed step setting. The menu will exit and you will see the corresponding speed selection in the Additional Loco Selection Info area.
6. Once the speed step setting you want to use is in the display, press the  key to complete the selection and speed step setting change. Once this change is made, the Digitrax command station will send DCC commands to the edited decoder in the speed step setting you entered.

#### Status Edit Loco#: Decoder modes

0-  
1- 28: 28step  
2- reserved 1  
3- reserved 2  
4- 128: 128step  
5- 28A: 28step/CV19  
6- reserved 5  
7- reserved 6  
8- 128A: 128step/CV19  
9-

## 4.8 Multiple Unit [MU] or Consist operations

It is not uncommon to see two, three or even four diesel locos pulling in consist at the front of a train. Sometimes, there is a locomotive added in the middle of the train or at the end of the train to give “helper service” to the head end locomotives. This is called Multiple Unit Operation or MU operation. With DCC, each locomotive is separately controlled. But in the case of MUing we would like to have more than one locomotive address controlled by a single throttle to simplify MU operation.

Your DT602 uses universal consisting to make MU operations simple and easy to do. This is the most flexible and realistic method of MUing available. You can add any locomotive to your MU, no matter what kind of DCC decoder is in your loco. You can even add an analog loco to your MU.






You can add a locomotive to an MU in either orientation and in any physical location in the train. When you send commands to the MU you use the address of the TOP locomotive to control the entire MU and the command station

handles the rest of the commands to the other locomotives in the MU. As the address you will use to control the consist is not necessarily the address of the lead or head end loco, we use the term “TOP” for this special address. The TOP address can also be the train number.

You will not be able change the speed or direction of any individual loco that is part of an MU, however you can control individual locomotive functions. Locomotive speed and direction for all locos in the MU are controlled by the TOP address

## 4.9 Adding a Locomotive to an MU

To MU two locomotive addresses together with the DT602:





1. Choose two locos you want to MU together. Place them on the track. Make sure that both locos that will be part of the MU are running in the same physical direction. Select and run the first loco to determine which way it is headed. Then select the other loco and run it in the *same physical direction*. They are now ready to consist.
2. Select the address you want to use to control the MU. This will be the TOP address. To do this, press  enter the address numbers & press  again.
3. Press  again to re-enter loco selection mode, and the large numbers in the Loco Info Area will begin to blink black and gray. The soft keys will also change to give you the options “MU” “Recall” and “MORE”.
4. Press  key labeled “Mu”: This will enter MU mode. The display will now show the TOP address below the blinking loco address number. It will say “Consist To:” and then your chosen TOP loco’s address. It will also now show a “MU+” soft key.
5. Use the Keypad to enter the locomotive address you wish to add to the consist.
6. Press  key now labeled “Mu+” to make a consist addition of the newly selected address.
7. The DT602 will consist the flashing address to the TOP loco, exit MU mode and the TOP locomotive will remain selected on the throttle
8. To add additional locos to the MU/consist repeat steps 3-6.

If your MU could not be set up the DT602 will display and informational message in the Scrolling Help Text line.

This happens when you try to link to an address that is already part of an MU or link an address that is under the control of another throttle. For example if you MUed address 14 to the TOP loco 23 and then tried to MU another address to 14 you would get this error. If you wanted to add another loco to the MU with 23 as the TOP address, the right way to do it is to add that loco to 23, not to another address in the MU.

## 4.10 Removing a Locomotive from an MU

To remove a locomotive address from an MU:



1. Select the locomotive address you want to remove from a consist. To do this, press  and enter the address numbers. The large address numbers in the Loco Info Area will begin to blink black and gray, and the consist flag “cn” should show in the Loco Info area indicating this address is in a consist. The soft keys will also change to give you the options “MU”, “Recall” and “MORE”& press  again.
2. Press the  once to enter MU mode, If the flashing address is in a consist the new soft key settings will include an “MU-” choice
3. Press the  key labeled “MU-”: This removes the flashing address from the consist. The DT602 will exit MU mode and the removed locomotive will now be selected on the throttle.

## 4.11 MU of mismatched locomotives

If all the locomotives in the MU have performance characteristics that are closely matched, you can run all the MUed locomotives in e.g. 128 step mode. If the units are completely mismatched (for example, if you are running two different brands of locos with noticeably different characteristics), then we recommend speed matching the locos by programming the decoder with either Simple 3 step or Advanced 28 step loadable speed tables (See your Decoder Manual for more information on these features of your decoder).

## 4.12 Controlling functions on MU’ed locomotives

Even though an individual locomotive is part of an MU and you can’t control its individual speed and direction, you can still control its function outputs independently as follows:

1. Select the loco that is part of an MU which you wish to independently control functions. To do this, press  enter the address numbers & press  again to complete selection of the consisted loco.
2. Now use the numeric keypad to control the consisted loco’s functions like you would any other loco. The changes will take effect immediately if the locomotives are moving, otherwise changes will take effect when you reselect the TOP address on the throttle.
3. When you are finished turning functions on or off for the consisted loco, simply select the TOP address and resume running the MU.
4. Remember, you will not be able change the speed or direction of any individual loco that is part of an MU. Locomotive speed and direction for all locos in the MU are controlled ONLY by the TOP address loco.

## 5.0 Locomotive Functions

Most DCC decoders have function outputs that you can use to control lamps, LEDs, sound, smoke generators and other on/off devices installed in your loco-

motives. Most locomotives made today come with a head light and sometimes with a rear light, too. With DCC, these are controlled by the decoder's function outputs. You can also install additional DCC controlled lighting such as cab lights, Mars lights, ditch lights, rotating beacons and others on your locos. The addition of these functions can add to the fun and realism of your locomotives. ***You must have the functions installed and connected to the appropriate decoder function leads in order to use the following keys.***

## 5.1 Controlling Functions F0-F9

To operate functions F0-F9 on your locomotive:

1. Select the loco you want to control. By default the Home Operations Screen uses the keypad numbers to operate functions. On DT602 press the **A** key until you will see the "Fn+00" over the **A** key. Press the **C** key to get "Fn Info+" over the **C** key
2. Use the DCS52's numeric key pad to turn the same number 0-9 functions on and off. For example, to turn the head light or F0 on, press the **0** key. Press the **0** key again to turn it off. The corresponding function number will go blue for on and gray for off in the **Function Bar** area of the display.

**NOTE:** "Fn+00" should be over the **A** key and numbers 0-9 should be shown in the **Function Bar** area of the display.

### 5.1.1 Function 0 (F0) Headlights Forward and Reverse

Press the **0** key to toggle F0 between on and off. Each time the **0** key is pressed while in function mode, Function 0, also called F0 will change from off to on or vice-versa. On locos with reversing head lamps and back up lamps, the head lamp or back up lamp in your loco will come on depending on the direction of travel of the loco. Function 0 is most often used to turn on/off the head light/back up light but can be set up for other functions as well (See your Decoder Manual for more information). It can be used as two functions.

### 5.1.2 Functions 1, 3, 4, 5, 6, 7, 8 & 9

Press the number key on the numeric keypad that corresponds with the function number you want turn on/off. The function will toggle between on and off each time you press the number key.

### 5.1.3 Function 2 (F2) Momentary Operation

Press the **2** key on the numeric keypad. The **2** key operates Function 2 and is the preferred function for whistle or horn operation. This key is set up as a "non-latching key" so that if a horn or whistle sound is installed in the loco, it will sound for as long as the key is held down. This lets you vary the length of time that the horn or whistle blows, just like the prototype.

## 5.2 Functions 10 through 28 (F10 - F28)

From the Home Operations Screen, press the **A** labeled “Fn+00” to cycle through the functions “Fn+10” and “Fn+20”. When “Fn+10” is displayed over the soft key the numeric keypad will control functions 10-19. If “Fn+20” is displayed the keypad will control functions 20-28. Press the **A** again to return to “Fn+00” which will allow the keypad to control functions 0-9. In addition to watching the soft key data the full function number and status will be displayed in the **Function Bar** area of the display.



## 5.3 Fn Info+ : expanded function status

If you wish to view the status of all 29 functions at once you can use the “Fn Info+” soft key. From the Home Operations Screen, press the **C** labeled “Fn Info+” this will expand the **Function Bar** area to show functions 0-28. To collapse this function display press the **C** then labeled “Fn Info-”.

**NOTE:** The functions controlled by keypad still correspond to the status of the **A** key “Fn+00”, “Fn+10”, and “Fn+20”.

## 5.4 Troubleshooting Function Operation

**If the function you want to operate does not respond, check the following:**

1. Is Track Status on? If not press the **Power/Back Key** to turn it on.
2. Did you select the correct loco? If not, select it now.
3. Is the function you want to use installed in the loco? If not, you may need to install it. Most new locos have a head lamp/backup lamp installed, but most do not have any additional lights or sounds installed.
4. Change the position of the **Direction Control switch** and see if the lamp comes on in the other direction. If the normal direction of travel feature in the decoder loco is set for the opposite of what you were expecting, you will see the head lamp operating in what you expected to be the reverse direction and vice versa for the back up lamp. See your Decoder Manual for information about how to change the Normal Direction of Travel (NDOT).



## 6.0 Switch/Turnout control mode

Switch Mode is most commonly used for sending commands to accessory decoders to control layout turnouts, and also for changing Option Switches (OpSw) on other LocoNet devices. Switch commands may also be used for controlling Digitrax compatible signal units. This section assumes that you have already installed and programmed turnouts and turnout decoders on your layout.

To change the position of a turnout:

1. Press the **S** or switch key.
2. The last switch address you selected will be displayed in the **Switch/Info + Area** of the display shown in Figure 2. If 0001 was the last switch you used and was thrown, the display “Switch:0001=Thrown” will be shown.
3. Use the numeric keypad to enter the turnout address for the turnout or switch you want to change.
4. Press **A** key for “Thrown” action, and the **B** key for “Closed”, to change the turnout or switch accessory decoder position.
5. When you have finished your switch operations, press **X** to return HOME to normal operation mode.



**NOTE:** The “Closed” or “Thrown” shown in the display may or may not match the physical position of the turnout selected.

**NOTE:** When you are in switch control mode, the throttle knob and their direction keys will continue to drive the loco address running on the throttle, but the numeric keys are used for switch address selection and not function control.

## 7.0 Expanded Menu Features

To reduce display clutter the DT602 places expanded menu choices in a menu system accessed by the **≡** or MENU key. Pressing the **≡** key from the HOME screen will bring up the MAIN Menu A screen with several numeric key selection choices shown, such as Decoder programming, Utility and Throttle option setup, etc.

MAIN Menu A:

- 0- Last Menu
- 1- Quick Decoder Setup
- 2- CV Programmer
- 3- Utility Tasks

## 7.1 Programming Your Decoders

Decoders are programmed when the command station sends programming information to them through the rails. Your DT602 supports two types of programming: **Programming on the Mainline** and **Service Mode Programming** on an electrically isolated separate programming track.

Using **Service Mode**, the command station broadcasts programming informa-













| | | EXIT

tion to all decoders on an isolated program track. Because this is a broadcast mode, you must isolate the decoder you want to program by using a separate programming track that is connected to the command station for programming but not powered for operation of the locomotive. This mode works with all DCC decoders. This is the most commonly used programming method.

Your DCC Decoders have many different **configuration variables** (CVs for short) that let you set up a different set of characteristics for each decoder installed in a locomotive. When you want to change a loco's address, set up how its lights work, change its momentum characteristics, etc. you will program new CV values into the appropriate CVs to set it up just the way you want. ***Please consult the manual provided by the manufacturer for how CV's are used and programming instructions for your decoder model.***

### 7.1.1 Using Quick Decoder Setup

Be sure that only the locomotive you want to program is on the programming track if you use Direct, Paged or Physical types of Service Mode CV programming.

1. To enter Quick Decoder Setup, press the  key. Main Menu A will display giving you a list of menu options. Select 1-Quick Decoder Setup by pressing the  key on the keypad.
2. This will put you in Quick Decoder Setup. This uses *Direct Programming mode on the program track*. In this mode you can change the locomotive address AD2, AD4 and CV29 settings.
3. Once in the Quick decoder setup menu you can change AD2 and AD4. You must decide what address you want to use, for addresses 0000-0127 you will use AD2. For addresses 0128-9983 you must use AD4.
4. Press the  key "READ" to read the current data from your decoder. This step isn't required but is useful in confirming existing decoder settings.
5. To set AD2 press the  key on the keypad to highlight the AD2 line. Press the  key "DATA" to modify AD2. Use the keypad to enter the address you want to use, press  key "WRITE" to write the AD2 address to the decoder. To make changes to AD4 or CV29 press the  key "SELECT" to select additional lines in the Quick Decoder Setup Menu. If you are done making changes press the  key.
6. To set AD4 make sure you are back in select mode ( key will read "DATA"). Press the  key on the keypad to highlight the AD4 line. Press the  "DATA" to select the line. Use the keypad to enter the AD4 address you want to use, press  "WRITE" to write the address to the decoder.

Pd Mode		
0- Last Menu		
1- AD2 ShortAdr =		
2- AD4 Long Adr =		
3- CV29 Value =		
4- NDOT Rev		OFF
5- 28 not 14 Step		ON
6- Analog		ON
7- Speed Table		OFF
8- Use AD4		ON
9-		
READ	WRITE	DATA

**NOTE:** "Use AD4" in CV29 must be set to OFF to enable AD2 and must be

set to ON to use AD4. The DT602 will automatically set this value when a change is made to AD2 or AD4. This option can also be manually set by following the below steps.

7. CV29 can also be setup in the Quick Decoder setup. CV29 also called the Configuration Register is a special CV that controls a number of characteristics for your decoder. CV29 controls:
  - Normal Direction of Travel (NDOT)
  - Speed Step Control: Advanced Mode or Standard Mode
  - Analog Mode Conversion
  - Speed Tables
  - 2 or 4 digit addressing

See your decoder manual for a full listing of these features.

8. CV29 can be changed two ways in the Quick Decoder Setup. When in Select mode (**C** key will read "DATA") simply press the number key corresponding to the feature you want to toggle off/on. For example pressing the **4** key will toggle analog mode conversion off and on. The CV29 Value will automatically be calculated. Once you have all the settings configured the way you want simply press the **B** "WRITE" to write the configuration to the decoder.
9. Alternately, if you know the CV29 Value you want to program into the decoder you can select it and use the keypad to enter the number. CV29 values can be looked up in the Decoder Manual or on [www.digitrax.com](http://www.digitrax.com).
10. To manually enter the CV29 value. Press the **3** key on the keypad to highlight the CV29 Value line. Press the **C** "DATA" to select the line. Use the keypad to enter the value you want to use, press **B** "WRITE" to write the value to the decoder.
11. After values are written to the decoder the text "CV Task Completed OK" will scroll in the **Scrolling Help Text** line.

## 7.2 Read and Write Configuration Variables

There are many different CVs that have been defined to control the operating characteristics of your locomotives. Your decoder manual has a complete listing of CVs that are available in specific decoders, what they do and suggested values for each CV. Programming these CVs is straightforward:

1. Be sure that only the locomotive you want to program is on the programming track (if using Operations mode CV programming the loco will need to be on the powered mainline).
2. To enter the CV Programmer, press the **FJ** key.
3. Main Menu A will display giving you a list of menu options. Select 2- CV Programmer by pressing the **2** key on the keypad.
4. You will be presented with CV Program Menu A. From this menu use the keypad to select the method of programming you wish to use by pressing the corresponding number.

- 1-Po; Ops on Mainline
- 2-Pd; Direct on Prg Trk
- 3-Pg; Paged on Prg Trk
- 4-Ph; Physical on Prg Trk

Note: Direct programming is the Digitrax preferred method

- Once you have selected a programming method, it will be listed above entries for CV number and CV data. CV number is the number of the CV you are changing. CV data is the value you are programming to the CV number.
- To change the CV number you are editing press the **A** “CVNUM”, then use the keypad to enter the CV number you want to change.
- Once you have the CV number selected press the **B** “CVDATA”. The soft keys will change to “WRITE”, “READ”, and “BACK”. Press the **B** “READ” to read the current value of the CV number you have selected. Use the keypad to enter the value you wish to program to the CV number you have selected. Press the **A** “WRITE” to save the data entered. The **Scrolling Help Text** line will read “Program Task OK” when it has successfully programmed the value.
- Press **C** “BACK” to exit to the previous menu to select another CV to change if you wish. If you are done editing CVs press **C** “DONE” to return to normal operations.

#### CV Program Menu A:

0- Last Menu  
 1- Po; Ops on Mainline  
 2- Pd; Direct on Prg Trk  
 3- Pg; Paged on Prg Trk  
 4- Ph; Physical on Prg Trk  
 5-  
 6-  
 7-  
 8-  
 9-

CVNUM | CVDATA | DONE

#### CV Program Menu A:

2- Pd; Direct on Prg Trk

CV Number: **0001**

CV data: **0001**

CVNUM | CVDATA | DONE











## 7.2.1 Programming On The Mainline

**Operations (OPS) Mode Programming** lets you program CVs in DCC locomotives equipped with extended packet format decoders while they are running on the mainline. A typical use for OPS mode programming would be to change the acceleration rate (CV03) or the deceleration rate (CV04) of your locomotives to simulate the weight and braking capability of the train to compensate for changing the number of cars or power units on a train.

Your DT602 can use OPS Mode Programming to change the CV value in ANY CV, including 2 digit and 4 digit addresses, but some decoders may not accept changing these CVs in Operations mode.

### How to use Operations Mode Programming:

- Make sure the loco you want to program is on the powered up mainline connected to the Rail A and B terminals of your command station.

2. Select the Locomotive on your DT602. Operations Mode programming will program the active address on your DT602.
1. To enter the CV Programmer, press the . Main Menu A will display giving you a list of menu options. Select 2- CV Programmer by pressing the  key on the keypad.
2. You will be presented with CV Program Menu A. From this menu press  key to select Po; Ops on Mainline.
3. In addition to Po; Ops on Mainline, the display will also show Ops Prg ADR: followed by the address you will be programming on the mainline. This information will be listed above entries for CV number and CV data. CV number is the number of the CV you are changing. CV data is the value you are programming into the CV number.
4. To change the CV number you are editing press the  “CVNUM”, then use the keypad to enter the CV number you want to change.
5. Once you have the CV number selected press the  “CVDATA”. The soft keys will change to “WRITE”, “READ”, and “BACK”.
6. Use the keypad to enter the value you wish to program to the CV number you have selected. Press the  “WRITE” to save the data entered. The **Scrolling Help Text** line will read “Program Task OK” when it has successfully programmed the value.
7. If you have Operations mode capability in the locomotive’s track section, press the  “READ” to read the current value of the CV number you have selected, see the note below.
8. Press  “BACK” to exit to the previous menu to select another CV to change if you wish. If you are done editing CVs press  “DONE” or  key to return to normal operations.

**NOTE:** OPS Mode Programming on most systems is *write only*, so you can change a CV to a new value you want without knowing what it was in the decoder. OPS mode read back requires Digitrax compatible transponding decoders and transponding detectors on the layout in order to provide the two way communication required for OPS Mode read back.

## 7.2.2 Programming Error Messages

When you are programming decoders, there are a few error messages you may encounter. The messages will scroll in the **Scrolling Help Text** line.

**“Program Track Empty”** means there is an open circuit on the Service Mode programming track and no current draw is detected by the programmer.

**“No Decoder ACK Pulse!”** means there is no acknowledgment from the decoder typically during decoder write operations.



**There are many causes for these error messages but most can be solved by checking the following:**

1. Be sure the programming track is connected properly to the command station.
2. Be sure a decoder is correctly installed in the locomotive with all motor and pick up connections made correctly. The motor must be connected to draw sufficient programming acknowledgment current.
3. Be sure the loco with decoder correctly installed is making electrical contact with the programming track and that it remains in contact with the programming track until programming is complete.
4. Be sure there is not too much current draw from lamps and other loads from the locomotive that is being programmed.
5. Be sure the decoder you are programming supports the programming mode you are using. Not all decoders support all programming modes.


## 7.2.3 Configuration Variable (CV) Programming Notes:

1. Check your decoder manufacturer’s manual for factory settings, recommended CV value ranges and for instructions on resetting the CVs to factory settings.
2. It is good practice to record the changes you make to the CV values for each decoder/locomotive combination. This will allow you to profile each locomotive type for programming similar locomotives.
3. Resetting your decoder CV values to factory settings can eliminate some problems caused by inadvertently changing a CV value.



### 7.3 Utility tasks for setup:

To enter the Utility Menu, from the home screen press the  key. Main Menu A will display giving you a list of menu options. Select 3- Utility Tasks by pressing the  key on the keypad. This will enter the Utility Menu


#### 7.3.1 Soft Clear


If the DT602 is plugged into LocoNet in Utility Menu, pressing the  key will start a Soft Clear. In this mode the Loco Motive speeds are set to zero and the functions are turned off.

#### 7.3.2 Fast clock editor

In the Utility Task screen press the  key to enter the fast clock edit screen. The prompt line covers the key inputs. The speed knobs change the hours and minutes and the numeric keys set the fast clock rate, up to a maximum of x20. Rate of 00 stops the fast clock. When the values are what you want, press the  “Save” key to update the fast clock back to the system.

#### 7.3.3 DT602 Options Editor

In the Utility Task screen press the  key to enter the throttle Options Editor screen. This is where you can personalize many settings for this throttle.

1. In Options Editor the left knob scrolls through the available option line ID numbers and the right knob changes the current setting. The “UP/DOWN” soft keys will also change the ID number of the option.
2. When you have the desired setup press the  key to save the settings and exit.
3. Line ID# 40 is the return to Factory Default setting choice, which are good for most usage.

The available Options are described by the text, and more details are on the Digitrax web site.

The LCD normal brightness level is set by Option ID15 “Max LCD brite level” and will begin to dim to level ID16 “Min LCD brite level” after ID18 “LCD Brite hold delay “. For ID18=0 the LCD is always ON, with no power saving. ID19 “LCD pwr save delay“ sets the time at the lower ID16 level

#### UTILITY Menu:

- 0- Last Menu
- 1- Soft Clear
- 2- FastClock edit
- 3- Throttle Option edit
- 4- Route edit
- 5- Duplex RF Scan
- 6- Duplex Edit

EXIT

#### EDITING Fast Clock:TIME

Rate: 00

00:09 am

Do Alarm

Save

#### DT602 Options Editor:

ID	Option Name	State
1	Ballistic Knobs	=on
2	Key clicks	=on
3	Duplex RF allow	=on
4	IR allow	=on
5	Fast Clock show	=off
6	24Hr Clock mode	=off
7	Fclock Alarm	=off
8	Enc=>LCD wake	=off
9	FnKey=>LCD wake	=off
10	Expanded Cmds	=off

Up

Down

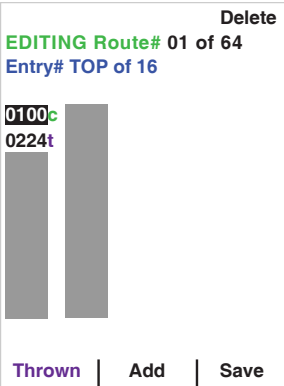
Change

before the display turns OFF for maximum power save and battery life. Higher numbers increase LCD brightness and delays.  
Option ID8 “Enc=> LCD wake” and ID9 “FnKey=>LCD wake” allow you customize which input actions will restore LCD display, whilst these actions still control your locomotives with the LCD OFF.

7.3.4 Route Editor

In the Utility Task screen press the **4** key to enter the Route Editor screen. If your command station supports LocoNet system routes and these are enabled you will see the Route Edit screen.

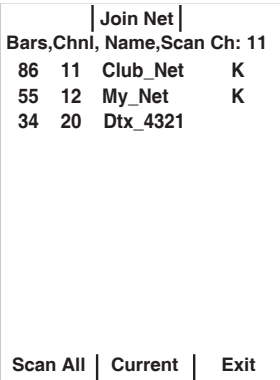
- 1. The left knob scrolls through each available Route. The display will show all the route’s available switch entry numbers and settings in table form.
- 2. The right knob scrolls through the Entries of the selected route and highlights by reversal the current entry to edit.
- 3. The numeric keys allow setting the switch address for the highlighted entry. Note entry 1 is the “TOP” switch and is the switch number and direction that triggers this route.
- 4. The **A** key will toggle the highlighted entries’ switch direction between Thrown to Closed.
- 5. The **B** key will ADD a new entry at the current highlighted entry position, and push down the following entries.
- 6. The **F** Delete key can be used to remove the highlighted entry
- 7. When the route edit is complete press the **C** key to “Save” it back to the system. *To keep any changes press “Save” before changing Route#.*



7.3.5 Duplex RF Scan (DT602D)

While NOT plugged into LocoNet, in the Utility Task screen press the **5** key to enter the Duplex Scan screen.

- 1. Press the **A** key to scan All Duplex channels (each channel takes about 1 sec to scan),
- 2. Press the **B** key to scan just the Current duplex channel,
- 3. The Duplex networks seen will display, with highest ten showing: Bars of signal strength, channel number, and Net name. A following letter K indicates you will need the 4 digit key to join that network,
- 4. Use the encoder knobs to highlight the line with the desired network,
- 5. Press the **E** or “Join Net soft key to Join the selected network.
- 6. Use the number keys to enter the KEY code, if required





**7.3.6 Duplex settings Editor (DT602D)** If a DT602D is plugged into LocoNet, in the Utility Task screen press the **6** key. DT602D Duplex-enabled throttles will show the Duplex Edit screen, allowing Duplex setting modification.

1. Follow the prompt scroll to select and modify the Duplex settings wanted.
2. When complete press the **C** “Update” key to write the new settings to the LocoNet system.
3. A Key value 0000 turns OFF the joining pass-key# requirement.

**Duplex Info Edit:**

**RF Net Name:** Club\_Net  
**Channel #:** 15  
**Key#:** 4567  
**IR ID#:** 01

| | Update

## 8.0 Emergency Stop

**To stop *everything* on a powered layout immediately:**

Press the **U-** key then the **A** key to turn off track power to the whole layout. This option will stop everything on the layout, without knowing what locomotive is on which throttle, or the need to actively control the speed of any locomotive.

Do not turn Track Power off during a short circuit. Clear the short first.

**To Emergency Stop the active knob controlling a locomotive:** Press and hold down the **x** key for about one second and the speed will go to zero and the throttle will beep. The release the **x** key, or hold down for another about 1/2 second to also emergency stop a locomotive controlled on the other DT602 knob.

**Having Trouble Stopping?** If the deceleration CV value you set for a particular loco is very large, this can make it look like the loco is not stopping on command because the deceleration CV value is causing the loco to take a long time to come to a stop. Emergency stop commands force an immediate stop with no deceleration delays.

## 9.0 FCC/Regulatory Information

FCC: DT602D/DCE contain FCC Module ID: LV3RF28

Declaration of Conformity: “This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

“This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures: Reorient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.”

OEM RF28 Manufacturer/Responsible Party: Digitrax Inc., 2443 transmitter Rd, Panama City, FL 32404, USA. (850) 872 9890. Model: RF28

“Changes or modifications not expressly approved by Digitrax Inc., the party responsible for original RF28 Certification compliance under 47 CFR15.212, could void the user’s authority to operate the equipment”

**Canada ISED RSS:** Contains Canadian ID module: IC:3015A-RF28

This device complies with Industry Canada’s licence-exempt RSS’s. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.”

“Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes : 1) l’appareil ne doit pas produire de brouillage; 2) l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.”

RF28 RF Exposure Guidance: “In order to comply with FCC / ISED RF Exposure requirements, this device must be installed to provide at least 20 mm separation from the human body at all times.” “Afin de se conformer aux exigences d’exposition RF FCC / ISED, cet appareil doit être installé pour fournir

au moins 20 mm de séparation du corps humain en tout temps.”

The DT602 charging a BP600MH battery meets DOE UEC requirements

### **Patents and Trade Secret**

Digitrax uses material covered by US Patents 6,220,552, 6,275,739, 6,318,678, 6,367,742, 6,545,886, 6,513,763, 6,747,579, 6,536,716, 6,533,223, 6,533,224, 8,229,582, 8,292,237, 6,729,584 and others under non-exclusive licenses and/or assignments from Anthony J. Ireland. Licensing for material covered by these patents are available to other companies and individuals. Other patents covering technology used by Digitrax are pending. Measures to protect trade secret information are enforced.

Digitrax licenses the commercial use of LocoNet, which is trade secret technology, to other companies on a non-exclusive basis. LocoNet is copyrighted property.

## **10.0 Warranty and Repair Information**

Digitrax gives a one-year “no worries” warranty against manufacturing defects and accidental customer damage on all Digitrax products. That’s it! Simple, straightforward warranty, no tricky language!

All warranties on Digitrax products are limited to repair or replacement of Digitrax products at the discretion of Digitrax. Except to the extent expressly stated, there are no warranties, express or implied, including but not limited to any warranties of merchantability or fitness for a particular purpose.

For items that are no longer covered under warranty, whenever possible we will make repairs to units at fair and reasonable rates.

Please visit our warranty and repair page at [www.digitrax.com/warranty](http://www.digitrax.com/warranty) for warranty and repair information and procedures.

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**Digitrax, Inc. is not responsible for unintentional errors or omissions in this document.**

## Need Help?

**Digitrax Tech Support Team**

**Need Help?:** [helpdesk.digitrax.com](https://helpdesk.digitrax.com)

### **Digitrax Tech Support Depot 24/7/365**

[www.digitrax.com/support](https://www.digitrax.com/support)

Contains links to all instructions sheets and manuals, application notes, videos and tons of helpful information.

### **Digitrax Decoder Selector**

[www.digitrax.com/decoderselector](https://www.digitrax.com/decoderselector)

Helps you find which decoder will fit in a particular locomotive.

### **Digitrax CV Calculators**

[www.digitrax.com/support/cv](https://www.digitrax.com/support/cv)

Calculate a CV value to program your locomotive,

### **Digitrax Tool Box App**

[www.digitrax.com/toolbox](https://www.digitrax.com/toolbox)

Download our Mobile App for on the go help at your fingertips. This app contains links to all manuals and instruction sheets, videos, CV calculator, decoder selector, news and events & dealer locator,

### **Warranty and Repairs**

[www.digitrax.com/support/returns](https://www.digitrax.com/support/returns)

Fill out the online form, print it out and return it with your item for repair