














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1.0 Introduction

Congratulations on your purchase of a Digitrax BT2 “Buddy Throttle”!

The BT2 “Buddy Throttle” can be used with Big Boy or Chief Starter sets and with LocoNet Compatible software like WinLok. The BT2 contains a subset of the DT100 & DT200 Throttles’ capabilities. The BT2 can’t directly select a locomotive or consist itself, but “acquires” a locomotive or consist that is dispatched by a DT100, DT200 or other advanced throttle with dispatch capability. The BT2 throttle allows serious operators to add Dispatched operations “discipline” during formal operating sessions.

In a less formal environment, the BT2 allows visitors to a layout to use locomotives that have been selected and dispatched (or given) to them by their host. There are fewer keystrokes and less instruction involved so that the user can be running locomotives quickly. With this arrangement the BT2 operator can run one or two trains controlling speed and direction as well as the functions installed in the locos. The BT2 user can stop his or her trains but not the whole layout.

Your success with and 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 you install your BT2. We have included lots of hints and operating ideas based on our experience with the Digitrax system. If you have questions not covered by this manual please contact your dealer.

2.0 BT2 Throttle Features and Specifications

- The BT2 is a LocoNet Throttle, designed to operate on an existing Digitrax LocoNet system. The BT2 can acquire and run either one or two locomotives or consists that have been dispatched to it by any dispatch capable throttle (or computer program). The user can control speed, direction, and functions for these units. By pressing Run/Stop, the user can stop the units he is running but will not stop the whole layout.
- Digitrax LocoNet expansion network forms a simple, reliable interconnect between all Digitrax Command Control System components using extremely reliable and convenient gold plated RJ12, 6 pin modular telephone jacks.
- 128 speed step operation! You can select 14, 28, or 128 speed step operation for each individual Digitrax decoder when you program it with a DT100 or DT200 so you don’t have to sacrifice performance if you have some decoders that have 128 speed steps and some that don’t.

- LED indicators show throttle status at a glance & make operation easy.
- Use either knobs or buttons to control speed.
- Encoder Knobs give incredibly fine speed control. And when you acquire a Dispatched loco, the knob position does not change the speed of that loco. No more rushing to adjust the throttle to match the loco’s speed!
- Capable of controlling a Dispatched UniVersal™ Consist
- Control directional lighting & 4 additional function outputs from the keypad. Sound controls for bell & whistle are on F1 & F2. F2 is a non-latching control that allows you to sound the horn for as long as the key is held down.
- Broadcast Mode allows the BT2 to be used as an input device with a computer system where the computer is acting as the system command station.

3.0 BT2 Installation Guide

These simple instructions will get you up and running quickly. You can investigate the specifics later but, for now let’s get your trains running. A full description of all controls and technical reference information are included in this manual.


This section assumes you have a running Big Boy or Chief set. You should also be familiar with operation of your DT100 or DT200 for selecting and running trains. Please refer to your starter set manual for the specifics if you are not already comfortable with your starter set and its operation.

3.1 Set up an operating LocoNet System



If you are using a Big Boy Set, connect and operate your system so the track is powered up and you can select and run locomotives on the DT200 (and any DT100’s or DT200’s you may be running). The DT200 that is running as the Command Station for the system should be plugged in to the “A” end of the LA1 or LA2 and any other operating throttles should be plugged in to the other end of the LA1 or LA2 via the LocoNet network. (See the hook up diagram in your DT200 manual.)

If you are using a Chief Set, connect and operate your system so the track is powered up and you can select and run locomotives on the DT100 or DT200. (See the hook up diagram in your Chief manual.)

3.2 Plugging the BT2 into LocoNet

A) Install the 9V battery. *Before plugging the BT2 into ANY jack*, install a 9V battery in the battery compartment at the lower rear of the unit. The positive “+” end of the 9V battery is toward the bottom of the BT2, as marked in the battery compartment. *The unit is protected against reverse battery polarity.* The unit will beep and the GREEN “ON” LED  will flash briefly then go out leaving none of the BT2’s LED’s lit.

If you don’t hear a beep, remove the battery, wait 1 minute and install the battery again by pressing the battery against the terminals quickly. If this does not work, check the battery voltage, which should not be less than 7.3 volts.

B) Plug the BT2 into any jack on the LocoNet network. The unit will beep once & the GREEN  LED will come on in about 2 seconds after you plug in to the powered LocoNet. The  LED will pulse slightly, like a “heartbeat,” about every second. This indicates that the BT2 is connected to a powered LocoNet network.


3.3 How to Dispatch & Acquire Locos


Any DT100 or DT200 on the system can dispatch trains to BT2’s. To Dispatch a locomotive or consist to a BT2 first you must select the loco address (or the Top loco address for the consist) and have it active in the LCD display of a DT100 or DT200. Follow the DT100 or DT200 instruction manual to select a loco or consist for dispatch.


To Acquire a particular dispatched locomotive address, the BT2 must have a clear throttle (one that is not controlling any address) & be the first BT2 on the system to request a locomotive after that particular loco address is dispatched by the DT100 or DT200.

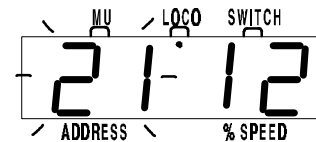
A BT2 acquire attempt will fail if:





- The throttle you try to assign the loco to is already active,
- There is no dispatched locomotive in the system or,
- If the acquisition process is not completed within 6 seconds of pressing the Loco/Acquire Key..








If the acquire attempt fails the BT2 will beep once & return to the normal ON state, with the ON LED indicator pulsing & the  direction indicator LED on the throttle you tried to acquire the loco on will not be lit.


A) Once the train to be dispatched is selected & is display active on the DT100 or DT200, press the  key again to release the locomotive you want to dispatch. The display will flash the address you are about to dispatch.

Verify that this is the address you want then press  to dispatch the loco or consist on that address. This makes the locomotive address selected available to the first BT2 that requests a dispatched locomotive.




For example, to dispatch locomotive address 21, first select address 21 on either of the DT200’s or DT100’s throttle knobs by pressing,  (the left hand side of the display will begin to flash the address selected). Use either throttle knob or the up/down arrows to select the address for dispatch (dial up address 21 so that it is flashing). Then press  again to set address 21 on the throttle (the display will stop flashing). To dispatch address 21 then press  once more followed by  to dispatch address 21. This example shows locomotive address 21 is released. Note that the number “12” on the right side is actually the status code for this locomotive, which tells us this is in 128 step mode and is “common” (selectable by anyone). See the Big Boy or Chief manual for the table of loco status codes.

B) After the locomotive address is dispatched by a DT100 or DT200 press the BT2’s  (Loco Acquire) button followed by either  (direction arrow) to acquire the dispatched locomotive. After the  (Loco Acquire) button is pressed, the green  (ON LED) will flash, prompting you to indicate which BT2 throttle, Left or Right you want to run the dispatched locomotive on. Just press the green  (direction arrow) for the side you wish to use. If you want to use the Right hand throttle press the  (Right arrow) key. The unit will beep & the  direction indicator LED will light up showing the direction of the dispatched locomotive that you have acquired. Green indicates forward direction, red indicates reverse direction.

C) You can now run the dispatched locomotive that you acquired on the BT2 throttle by turning the throttle knob. To change the direction, use the  direction arrow (L or R) associated with the throttle. To control the functions (lights, etc.) you use the function mode, see section 5.9.






NOTE: When you acquire a dispatched locomotive, it will have the same speed, direction and light/function states that it had when it was dispatched. To dispatch a consist, select the *TOP locomotive in the consist* for dispatch. See the DT100 or DT200 manual for MU instructions & for details about the TOP locomotive.

An active throttle on the BT2 is one with the direction  indicator lit.

3.4 How to clear a locomotive from a BT2 throttle

With a BT2 you can only acquire a dispatched loco address on a throttle that is *not currently active*.

Before you can acquire a new dispatched locomotive with a BT2 throttle that is *already active*, you must Clear the active throttle. When you clear the throttle, the locomotive that was in use by the BT2 throttle will be released as a *common* locomotive in the system, so that any DT100 or DT200 type throttle can select it. Note that *it will not be a dispatched locomotive*, so it cannot be reselected by the BT2 until it is re-dispatched by a DT100 or DT200. This ensures that BT2's can only operate locomotives and consists that have been explicitly assigned or dispatched to them.

- A) Press the  (Loco/Acquire) button to prepare for selecting the throttle you want to clear. The **ON**  LED will change from pulsing green to flashing green.
- B) Press the  (Select/Clear) button to request a throttle clear with the next direction key stroke.
- C) Press the direction key for the throttle you wish to clear for example, press the  (Right arrow) key to clear the right throttle. The BT2 will then beep and the  direction LED will no longer be lit for the throttle that you cleared. The BT2 will return to normal On mode.

4.0 What is LocoNet?

LocoNet is a powerful communications network designed by Digitrax specifically for model railroad applications.



LocoNet is truly a state-of the art "Peer to Peer" network. It is engineered for high performance, low cost and simple device hook-up. It allows fast, reliable, efficient transmission of DCC commands, throttle commands and feedback between the command station, attached PC computers (a computer is **not** necessary for operation) and the various devices connected to the network.

This system uses simple, reliable, readily available 6 conductor telephone wiring components to daisy chain command stations, throttles, boosters, and other devices together. LocoNet supports complete access for all current & future features within a single wiring scheme.


Best of all, you don't have to worry about it! All Digitrax command stations and throttles speak the LocoNet language and it is completely transparent to you! You just plug and play!



5.0 BT2 Buddy Throttle Control Panel

5.1 General color codes

The BT2 is color coded according to how the keys are used.

The GREEN colored keys and indicators are for locomotive speed and direction control.

The only RED key is  (Run/Stop). This is so you can't miss it in case of emergency.

The BLUE keys are related to function control. When the function mode is active, the green keys in the bottom row take on the blue meanings F3, F1 , F2 , F4.

5.2 The Left & Right Throttle Knobs

The Throttle Knobs on the BT2 are actually “encoders.” They give very smooth, fine speed control. In 128 speed step mode it takes several complete turns of the knob to go from stop to full speed. When you select a locomotive that is moving and set it on a Throttle Knob, the Throttle continues to run the locomotive regardless of the position of the Knob.

The BT2's throttle knobs use “ballistic tracking.” This means that the faster you move the throttle knob, the faster the data changes in the throttle. This makes it easier to stop a train that is going too fast or is about to cause an accident because when the throttle is turned quickly, the speed of the train will decrease quickly. Rather than taking several turns of the knob to bring the train to a halt, ballistic tracking allows you to do this in just one turn of the throttle knob.

If you already have a Big Boy and have been using a DT200, you will notice a difference in the way the knobs work because the DT200 comes with straight line tracking so that each movement of the throttle knob causes a fixed rate of change in the throttle's data. The DT100 can be configured for either straight line or ballistic tracking.

5.3 Direction Indicators


Red=Loco in Reverse

Green=Loco in Forward

Flashing=Throttle Active in Display, color showing direction

Flashing Orange=LocoNet Command Station has put layout in STOP mode. BT2 cannot affect this layout setting.

5.4 FUNC Function Mode Indicator

Glows red to indicate that the BT2 is in the function mode for the throttle with the flashing  direction LED.

5.5 ON LocoNet connection ON Indicator

Pulses green as a “heartbeat” to indicate that the BT2 is connected to a powered LocoNet.

5.6 Run/Stop

Press for about 1/2second to STOP the locomotives being run by this BT2 ONLY. The BT2 cannot stop the entire layout.


5.7 Select/Clear




Used for clearing a locomotive from a BT2 throttle and returning it to the system as a *common* address and making it accessible by other throttles on the system.

5.8 Loco/Acquire




Used to initiate a request for a dispatched locomotive or clearing a BT2 throttle.

5.9 Function/F0/Light Control

Press once to enter Function Mode. The  FUNC LED will glow RED.

Press  again to toggle the directional lights on or off. If the key press turns the function ON, the ON  LED will be green and the unit will give a long beep. If the function is turned OFF, the ON  LED will be unlit & you will hear only a short beep.

Press the key above F1, F2, F3 or F4 to change any of those functions you have available in your loco.

To exit Function mode turn either throttle, press either  or  key or wait 6 seconds without a key stroke. The red  FUNC LED will go out & the unit will return to the normal On state.

Note that any decoder you wish to run in 128 or 28 speed step mode,(as set up by the DT100 or DT200 dispatcher), must have its decoder Configuration programmed for Advanced 28 step mode for the lights to be controlled correctly. Refer to your Big Boy or Chief manual for a complete discussion of light set up.

5.10 & Left & Right Select/Direction Change Arrows

Changes the direction of the loco on the associated Throttle. Also used during the acquire & clear processes to select which throttle (L or R) to run a loco on or to clear a loco from..

5.11 & Up/Add & Down Arrows


Use to increase/decrease speed.

5.12 F3, F1 , F2 , F4

Active when in function mode. Use the keys above these designations to access the various decoder functions installed in your locomotives.

6.0 BT2: Walkaround Operations

6.1 Walkaround Operation On LocoNet

When a BT2 detects that it is NOT connected to a powered-up LocoNet it will enter the power saving “Idle” mode, and the “ON” LED not be lit. This occurs when you unplug a throttle to walk around the layout. When you reconnect a BT2 to a powered LocoNet, it automatically logs back on to the network & verifies that the command station has an *exactly* matching state for any of its throttles that were active when the BT2 was disconnected. If there is any discrepancy, the associated throttle will not be reactivated automatically. When the BT2 is reactivated, the  direction indicator LED's will be lit.

If a BT2 with active *in-use* locomotives is disconnected from LocoNet for more than the system purge time (about 200 seconds), the Command Station will purge these *in-use* locomotives to the *common* state so that other throttles can access these locomotives. If the original BT2 is reconnected after a purge of its last *in-use* locomotives, it will recognize this and not reactivate its throttles. To use the previously *in-use* locos that are now purged to *common* locomotives, they will have to be Dispatched again to the BT2 by a DT100 or DT200 throttle.

The designation of locomotives as *in-use* or *common* ensures orderly sharing of locomotives on the layout and increases the system's ability to run more locos at a time. See the Big Boy or Chief manual for a discussion of locomotive status, *in-use*, *common*, etc.


When LocoNet is powered down, or the BT2 is disconnected it draws its power requirements from its internal battery. If it is subsequently re-

connected to LocoNet it will remember **exactly** it's state prior to being “Idle”, as long as the battery is not removed or the unit is not RESET.




The BT2 will run on a new “alkaline” 9V battery for about 300 to 400 hours without being connected to LocoNet, before the battery voltage is too low. Most NiCd rechargeable batteries start fresh at 7.2 volts, which is close to the discharged voltage of an alkaline battery. Therefore we do not recommend rechargeable NiCd batteries. If the BT2 is on a powered LocoNet & the battery is exchanged for a new one, the BT2 will remember its throttle & ID# settings with no interruption because it draws power from LocoNet.

If the LocoNet is going to be OFF for a long time, and the BT2 does not need to remember the locomotives it was running, we recommend removing the battery. (The battery can simply be stored by installing with reversed polarity)

6.2 Stop Mode

If the  key is held down longer than about a 1/2second the BT2 will enter STOP Mode. Any Locomotive (or Consist) that is active in either throttle will be stopped. *The speed setting in both throttles will also be reset to 0 speed, e.g., stopped.* To return to regular operation, simply open the throttle of the locomotive that you wish to get moving again. Note that the BT2 has been designed so that it cannot stop any locomotive not under its control. It also cannot control whether Track power is ON or OFF.

6.3 BT2 Unit Reset

Press ,  &  keys simultaneously while connected to a powered LocoNet. This three key-stroke input will force the BT2 to reset & clear its internal memory. Removing and replacing the battery when the BT2 is not connected to a powered LocoNet will also reset the BT2.

7.0 Broadcast Mode

This mode allows the BT2 to be used on a Personal computer system that is acting as the system's DCC command station, but that does not “talk” the full LocoNet Master protocol. In this mode, the BT2 simply broadcasts it's preset ID# along with any speed or light/function changes. The computer program is responsible for assigning the throttle ID# to a locomotive or decoder address. This allows a user to have a DCC system controlled from a computer at minimum cost.

The Locomotive dispatch “acquire” and “clear” functions now send codes to the computer that alert the program that this throttle ID# wants a new locomotive, or to release a currently active locomotive.



7.1 BT2 Broadcast Mode

When a BT2 is plugged into a LocoNet network that is powered but **without an operating LocoNet Master**, it will detect that its log-on requests are ignored. If the user has set a non-zero ID# in the BT2, it will then enter the Broadcast Mode. *In this Broadcast Mode the ON LED will be a steady green with no “heartbeat” pulse or flashing.*


When the BT2 is reset or is first powered up, it will set its ID# to 0, which means it will not be allowed to enter Broadcast mode until an ID# is set by the user.


7.2 BT2 Broadcast Mode ID Code Setting


NOTE: If you are not using the BT2 with software configured for and running BT2 Broadcast mode, we recommend NOT setting the ID# in the BT2, in other words, leave it at zero (0) as it is when initially powered up. To set up a Broadcast ID# for a BT2:


- A) Disconnect the BT2 (with installed 9V battery) from LocoNet. The green ON LED will no longer be lit. *If the BT2 is plugged into a powered LocoNet it will not allow ID# setting.*
- B) Gently hold down the two  (Run/Stop) &  (Right Arrow) keys at the same time. It may take the BT2 up to 3 seconds to recognize this command and enter the ID setting mode. **Do not try to press harder on the keys if the unit doesn’t respond immediately**, it is “snoozing” in an internal low power state & can only see the keys when it checks the keys. Since this happens about every 2 seconds it may take up to three seconds for the unit to respond. Harder key pressure will not speed up this checking and it may damage the keypad!! When the unit recognizes the ID setting request the ON LED will glow a steady green.

C) In ID# Set Mode these keys perform the following functions:

 Clears the ID# to 0 (Broadcast mode disabled)

 Increases the ID# by 1

 Will “replay” the current ID# as the number of beeps, and flashes of the red **FUNC** LED. For example an ID# of 3 will “replay” as 3 red flashes & 3 beeps.

 Will exit ID# setting mode and return to normal idLE state with the ON green led no longer glowing.

When in the ID# setting mode either of the throttles can be used to increase the ID# by 1 for each click *turning in a clockwise direction*. The decreasing, counter-clockwise direction has no effect.

8.0 Warranty and Repair Information

BT2

One year guarantee on BT2. These units are not user serviceable (opening the case voids your warranty). If a defect occurs, return the unit to us for service. We will repair or replace these units at our discretion at no charge to you for one year from purchase date. This warranty excludes damage due to abuse, such as failure to properly protect against input over current with a fuse or circuit breaker or applying excessive input voltage to the unit. We will make any repair needed because of physical damage or electrical abuse at fair and reasonable rates.

In order to make sure we give you the best service possible, please call (770)441-7992 to let us know before you send anything to us for service or as a return.

All warranties on Digitrax products are limited to refund of purchase price or repair or replacement of Digitrax products at the sole discretion of Digitrax. In the event that Digitrax products are not installed or used in accordance with the manufacturer’s specifications, any and all warranties either expressed or implied are void. Except to the extent expressly stated in this section, there are no warranties, express or implied, including but not limited to any warranties of merchantability or fitness for a particular purpose.

FCC Information

Radio or TV Interference: (this information is MANDATED by the FCC)

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 environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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 or more of the following measures: 1) Reorient or relocate the receiving antenna. 2) Increase the separation between the equipment and the receiver. 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. 4) Consult the dealer or an experienced radio/TV technician for help. Note that any modifications to the equipment not expressly approved by Digitrax voids the user's authority to operate under and be in compliance with CFR 47 rules, as administered by the Federal Communication Commission. Digitrax believes any conscientiously installed equipment following guidelines in this manual would be unlikely to experience RFI problems.




For Canadian Users:


"This digital apparatus does not exceed the Class B limits for Radio noise emission from digital apparatus set out in the Radio Interference Regulation or the Canadian Department of Communications."




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
BT2 Cheat Sheet



DT100 or DT200 Dispatch Steps:







Select Loco To Dispatch to BT2 Press  Dial up Loco Address
 Press  again to Select the Loco
 Press  again to Release Loco for Dispatch to BT2.


Dispatch Loco to BT2 Press  to Dispatch Loco

Acquire Loco with BT2 Press  Then within 6 seconds
 Press either  or  To Acquire the loco on either the Right or Left Throttle

Clear a loco from a BT2 throttle Press  
 Press  Then within 6 seconds
 Press either  or 
 To clear the Right or Left throttle.

Accessing Functions Using BT2 Press  To Toggle Lights On & Off
 Press  Again.

Toggle Other Functions Press  For F3
 Press  For F1 
 Press  For F2  (Non Latching)
 Press  For F4

To Exit Function Mode Wait 6 seconds, Move either Throttle Knob
 Or Press  or 