Märklin Digital Newsletter

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Memory Tutorial

Part I

The Digital Memory unit (#6043) is perhaps the most interesting module in the mix of Märklin Digital components and is also probably the least understood. Many digital operators feel intimidated by the Memory because they perceive it to be more complex than it really is. The Memory's apparent complexity is often caused by its many operating modes. The following review and tutorial of the Memory is designed to simplify the confusion by discussing each of the Memory's operations and giving examples to help the reader visualize its functions.

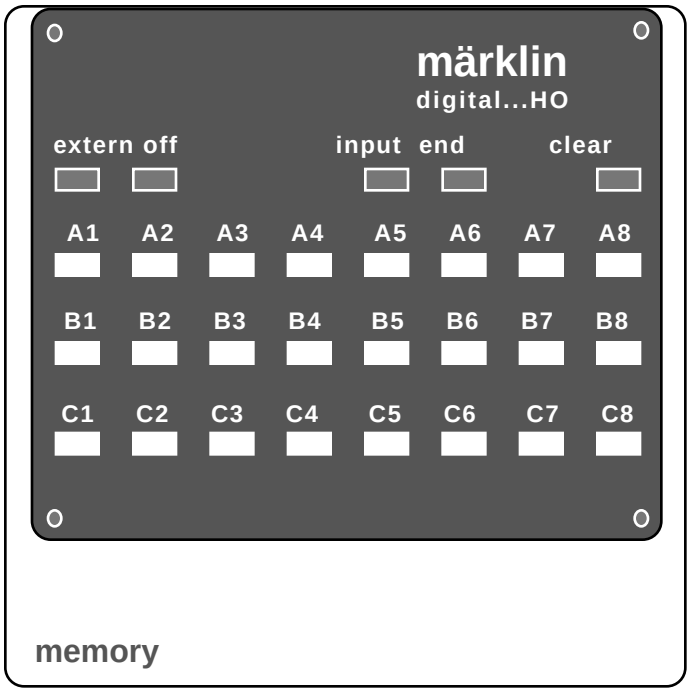

Illustration 1

The Memory unit is a route controller. A route is a sequence of switching commands of solenoid or relay accessories given initially by hand through a controller for digital accessories (i.e. Keyboard, Switchboard, Computer Interface or 6023 Central Control-i). Each route can contain up to 20 commands, and the Memory is capable of storing 24 of these route sequences. The last command in a route can also link to another route location on the Memory, thereby increasing the length of route operations to the full limit of 24 route locations in the maximum of 4 Memory units allowed on the Digital system.

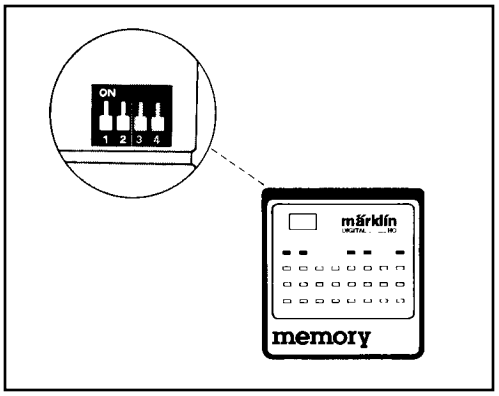

Illustration 2

After a route is entered into the Memory it is later easily recalled by simply pushing one button on the Memory where that route is stored. Accessory controllers used to program the routes can be removed from the chain of digital units or have their addresses changed after programming is completed. This means you could use one Keyboard to program a full compliment of 256 accessory items by changing Keyboard addresses and adding commands to existing strings of route commands already stored in the Memory. Remember, you have to reboot the system after each Keyboard address change. This is not the best way to operate a layout, because you may have to operate some accessories from the Keyboard, but it does reduce the number of Keyboards needed on a layout. Routes stored in the Memory are kept in the electronic memory of the unit even when it is unplugged from the system. Rechargeable batteries in the Memory keep its programming intact. Powering up the Memory periodically (annually at least) will keep the battery charged.

The back of the Memory has a socket for attaching s88 Track Detection Modules and a set of four DIP switches for selecting the address of the Memory (switches 1 and 2) and for activating its "interlocking" capability which will be discussed later (switches 3 and 4). Memory units are connected to the left side of any Märklin Digital Controller in the same fashion as are all accessory controllers. The order of addresses does not matter with the Keyboards and Memory units, and they can be intermixed with one another. It is also possible to have duplicate addresses which makes it possible for controllers located in remote locations to activate the same accessories as other digital units located in the main control area.

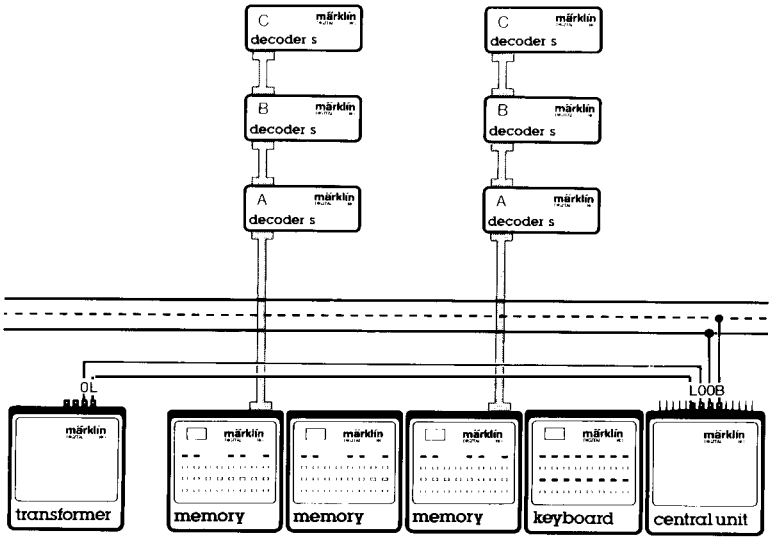

Illustration 3

Routes stored in the Memory unit can also be activated by track contacts which connect to the s88 Track Detection Modules. This activation process can be simple triggering much like manually pushing the button on the Memory by hand, or it can be more complicated interlocking where a route is protected from interference by another route until cleared. Track detection can take a number of forms such as Märklin's circuit track, contact track or reed switches. Other manufacturers' activators include infrared beams, light collecting diodes, pressure sensitivity resistors and coil inductors.

The Memory can be used in place of the computer Interface, but it cannot do all that the Interface does. The Memory is limited to accessory control, it cannot control the address and speed of a locomotive. Earlier articles in the Digital Newsletter have shown how accessory decoders can be connected to the Motorola chip on a loco's decoder for changing the address. Another article explained how the direction of the loco can be changed by activating a voltage doubler through a Keyboard. But, these are homemade projects which push the limits of the basic intent of the Digital system. Remember, the Memory acts as a computer for accessory control and can fulfill the Digital operator's desires from the simplest to the most grandiose layouts.

Two versions of the Memory Unit

There are two versions of the Memory unit. Each has some interesting advantages over the other. They can be identified by the panel lights that come on when the module is started up. With version "A" the "extern" light is on and with version "B" the "off" light is on. Version "A" is a faster version and allows for timing sequences to be set between commands through the Keyboard. Simply push Keyboard switches that are not connected to any decoders to cause short pauses between commands. Each keyboard switch can be pushed up to a maximum of 8 times. This version would be better for many smaller layouts since it is faster and commands are not likely to be to complex for the quicker speed of transmission.

Version "B" is more suitable for larger layouts and is slower in its transmission speed. This version changes the timing between commands through the Memory itself. An entire series of commands in a route can be spaced with timing pauses by pushing "extern" and then one of the buttons A1-C8 before pushing "end" at the conclusion of the route. A1 is the fastest timing pause and C8 would be the slowest. A single pause between commands can be entered by pushing "off" then the pause desired between A1 and C8 followed by the next command in the series. Be sure to push "end" at the conclusion of the route.

Version "B" of the Memory will also only make a single request for a route when there is constant contact on a track. This usually happens when a coach is parked on a track contact section and the signal repeatedly comes through the s88 to the Memory. With version "B" the request is made once until changes occur on the layout, such as another route is requested, then the train making a constant contact will only make a single request again.

Basic Applications for the Memory

The simplest use of the Memory is to program routes and accessory functions which you will manually request on the Memory.

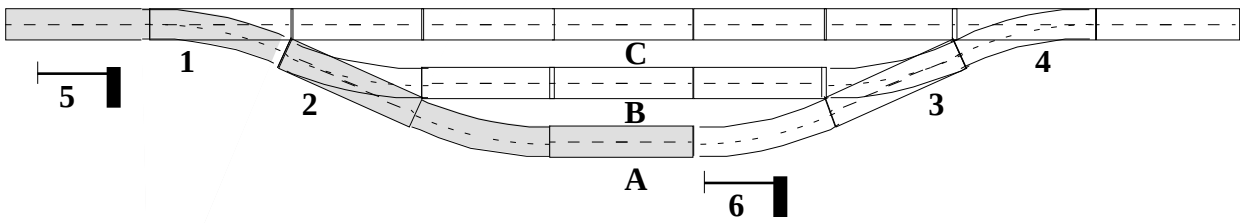

Illustration 4

In illustration 4 a route needs to be developed to move a train into a three track station area stopping the train at a signal. The route would include the following commands:

change the signal at location #5 to green
move turnout #1 to the curve setting
move turnout #2 to the straight setting
change the signal at location #6 to red thereby stopping the train on track "A"

Of course, the benefit of the Memory is that routes can also be entered to stop trains on track "B" and track "C". Those routes would have these commands:

change the signal at location #5 to green
move turnout #1 to the curve setting
move turnout #2 to the curve setting
change the signal at location #7 to red thereby stopping the train on track "B"

change the signal at location #5 to green
move turnout #1 to the straight setting
change the signal at location #8 to red thereby stopping the train on track "C"

And, in a similar fashion, routes can be developed to cause trains to leave the station area.

move turnout #4 to the curve setting
move turnout #3 to the straight setting
change the signal at location #6 to green thereby exiting the train on track "A"

move turnout #4 to the curve setting
move turnout #3 to the curve setting
change the signal at location #7 to green thereby exiting the train on track "B"

move turnout #4 to the straight setting
change the signal at location #8 to green thereby exiting the train on track "C"

The procedure for entering a route into the Memory is:

1. Press the "input" button.
2. Press the desired Memory location button from A1 to C8
3. Press the buttons on the Keyboard or Switchboard in the correct sequence
4. Press the "end" button.

When the "input" button is pressed, all Memory locations with existing routes will light up. You would need to select an empty location to start a new route. Selecting a location with existing commands will allow additional commands to be entered at the end of the present string of commands. It is also possible to clear out selected Memory locations, single commands, or the entire Memory unit. These operations are discussed later.

The first example given above for illustration 4 will be given step by step. It is assumed that the Memory unit is attached to the other Digital units and it is working. We will use location A1 for the route to stop a train on track "A."

1. Press "input"
2. Press the "A1" button
3. Press Keyboard button 1 red
4. Press Keyboard button 2 green
5. Press Keyboard button 6 red
6. Press Keyboard button 5 green
7. Press the "end" button

The last Keyboard button pushed was to release the train from the red signal at location #5. This allows all the other functions to be performed before setting the train in motion. With this route in the Memory, when a train stops at signal #5, you can easily move it onto track "A" by pushing the "A1" button and watch the accessories activate to mimic your initial commands.

Programming sheets similar to illustration 5 come with the Memory unit. They are filled in with the commands and location of the route. Illustration 6 shows how the sheet would look with the program used to stop a train on track "A".

MEMORY Programming sheet No. ..... Märklin ____digital

Command Number	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D
1																								
2																								
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TDM set																								
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MEMORY Programming sheet No. .....1..... Märklin ____digital

Command Number	SR..A./..1. No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D	SR..../.... No.	Set.	D
1	**1**	**R**																						
2	**2**	**G**																						
3	**6**	**R**																						
4	**7**	**G**																						
5																								
6																								
7																								

Illustration 5

Illustration 6

Clear Memory - The stored commands in any route can be erased either singly or with the entire group of commands in that route. To erase single commands press "input" and then the number of the route. Next press "clear" and the last command in the string will be erased. Press "clear" again and the next command is gone.

Continuous pressing of the "clear" button will erase command after command until the route is totally cleared of any earlier Memory commands. To erase the entire route; first, press "input", second press the "clear" button, then press the Memory route location (A1 through C8). If you have more routes which need clearing then repeat the process, each time selecting "input", "clear", and finally the number of the route.

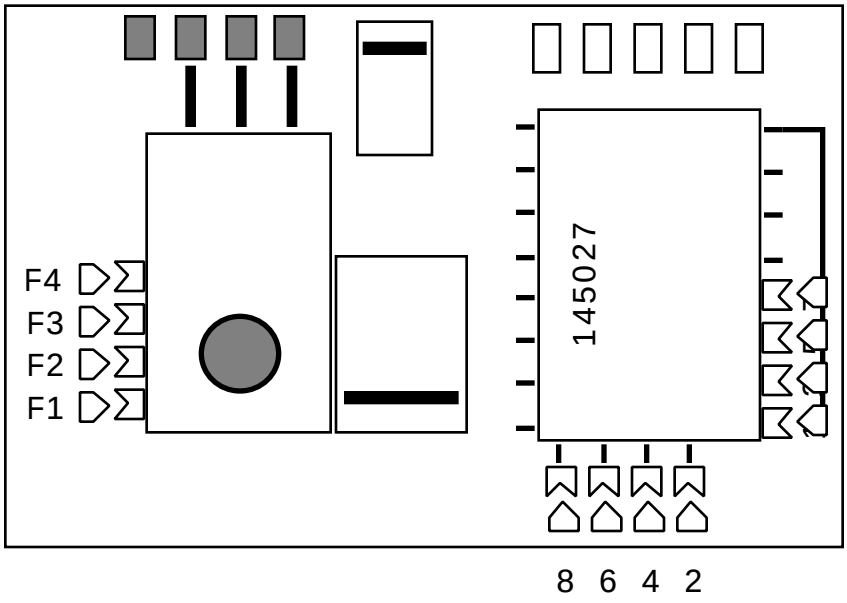
Mass Clearance of Memory Locations - It is possible to clear the entire Memory Unit by turning it off and then while restarting the Digital system hold down the Memory keys "extern", "B1", and "C1." This will light up all the routes being used and when your fingers are removed from "extern", "B1", and "C1" the "clear" button will light up. If you press that button all the routes will be erased. Before proceeding with memory storage it is necessary to turn off the Digital system and restart after this procedure. The Memory appears to function properly, but you will find the Keyboards are locked up. Restarting the system will free up all the Digital components.

Trouble Shooting - A quick check of the electronic circuits can be accomplished with another "boot-up" routine. Hold down the "extern" and "B1" buttons. The buttons will all come on, and then turn off in sequence from C8 to A1. When you let go of the "extern" and "B1" buttons, all the buttons on the Memory will light up. If both sides light up, the unit is working. If only the right half or the left half lights up, then some of the circuits inside are faulty and the Memory should be repaired. It is necessary to turn off the Digital system and restart after this procedure.

The second part of this Memory Tutorial will continue in the next edition of the Digital Newsletter. It will include "Intermediate Applications" and "Advanced Applications" of the 6043 Memory Unit.

New Format Accessory Control in HO Gauge

The new format for HO gauge decoders is expected to be delivered in the 3rd or 4th quarter of 1997. This format will include full trinary signals to the decoders in the same manner as we have seen in 1 Gauge for the past two years. If a 6021 Central Control is being used to send the signal, additional functions and enhanced operation can be expected from the loco. These new decoders require DIP switches 1, 2 and 3 on the back of the 6021 to be turned on, this will activate the trinary signal and allow for the extra functions on future locomotives.



Function Decoder

Two new locomotives are expected with the new decoders. One will be a diesel with sound, and the other is the Insider Club steam loco with the fans in the tender. Both of these new locos require the 6021 unit to activate the additional functions.

Some Digital operators have the 6020 or 6023 controllers and they have been asking if they can control these new decoders with the extra functions. The answer is yes and no. It is possible to control the loco, but not the extra function. The reason for this is that in the past, additional functions such as the Digital Crane, Panorama car and Dance Car were

considered accessory functions the same as signals and turnouts. Those functions are communicated at approximately 10 kHz while the loco commands are sent at approximately 5 kHz. In older units like the 1 Gauge with the old 2-rail system, it required two decoders to control both the loco and the extra 4 functions. The new full trinary decoders control the loco and extra functions all at the same speed of 5 kHz and eliminate the need for the extra decoder.

If you want to control the new extra function locos on the old 6020 or 6023 systems, you will need to install another decoder for functions. Märklin, Inc. has such a decoder from Nacka but it controls four additional functions, and you only need one function. Another decoder for single functions using the old trinary/binary format has now come from Sweden. These are made by Rene Sjöstrand and are available for $25 from Tom Catherall, 2410 S. State St., Springville, Utah, 84663. There is no profit made on these decoders, they cost Tom $20 and the extra $5 covers postage and transfer of money to Rene. They are provided as a service to digital users who want to access new functions with old hardware.

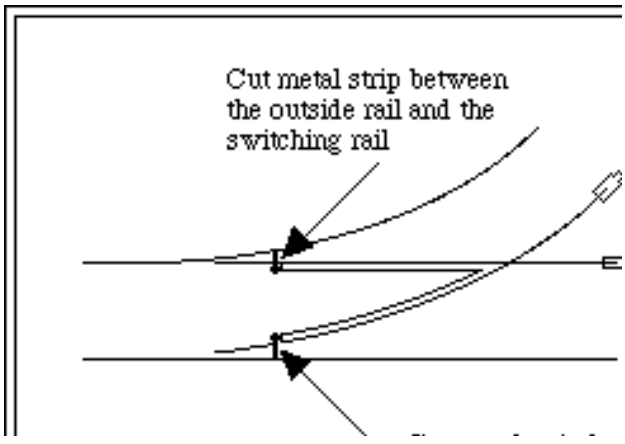
The decoders can be addressed to any of the 80 loco addresses and any one of the 4 function keys on the Control 80f. Addresses are set with solder bridges. Each decoder can take any of the 80 loco addresses by soldering the bridge connectors for the appropriate DIP switch which should be on. For example, address 64 requires DIP switch 2-3-6 to be on. In this case, only solder the bridges at locations 2, 3 and 6. Positions 1 and 2 are connected together so only one should be soldered at a time. Positions 2, 4, 6, and 8 are all the ground connections which set the address to -5 volts. Positions 1, 3, 5, and 7 are the positive connections coming from pin #8. They set the address for their connected pins to +5 volts.

The solder bridges at F1 - F4 are for the function buttons located on the 6021 or 6036 (Control 80f). Again, only one of these should be soldered at a time. Unsoldering any bridge can be easily done with solder wick. This is a woven copper flat cable which will soak up the solder when heated with a soldering iron while connected to the soldered bridge connection.

C Track Turnouts on 2-rail Layouts

Märklin fans who use their layouts for both 2-rail and 3-rail operations have been curious about the new C track and its ability to be used with 2-rail locos. The basic track pieces are easily converted to 2-rail by clipping the rail connections under the track the same way you would convert a piece of track to make it a contact track. The question has been whether the turnouts can be converted also. After looking at a turnout and cutting contacts here and there, it was discovered that it can be done, but care needs to be taken when operating the layout.

The diagram on the right shows where the switching rails are attached to the outside rails causing them to have common electrical connections. Once they are free from the outside rails they need to be isolated from the inside running rails with the 74030 little red caps.



The caution mentioned earlier has to do with running through a turnout when the turnout is set the opposite way of the oncoming locomotive. It is common knowledge that Märklin makes their turnouts with spring activated switching rails so trains can run a turnout the wrong way, but with this 2-rail conversion, that will short the system. So, keep the turnouts set to the direction of the trains.

Digital Hot Line

Help for your digital problems and questions is as convenient as a phone call or computer connection. Remember, Tom Catherall operates a help line for all Digital Club members. For assistance call:
(801) 378-4991 day time hot line
(801) 489-8971 evenings, weekends and summer
(801) 489-1087 FAX
catherall@byu.edu
or tom@marklin.com for e-mail on the Internet
75122,31CompuServe

The Märklin World Wide Web

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märklin
DIGITAL
P.O. Box 510559
16988 West Victor Road
New Berlin, WI 53151-0559