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1989 New Items Brochure Enclosed!

Märklin has announced plans to introduce more than 130 new items in 1989! Leading the way are an HO freight car set done in the historic Länderbahn paint scheme, a Z-gauge California Zephyr passenger train set with locomotive and cars in genuine silver plate, a Z-gauge version of the legendary King Ludwig Express Steam Locomotive and car set, plus a I-gauge all-metal Prussian EG 589 electric locomotive. You'll find these and many more new items detailed in the 1989 New Items Brochure, a copy of which is enclosed with our compliments. Also enclosed is a New Items price list with anticipated delivery dates. To reserve your New Items, see your authorized Märklin dealer today!

MÄRKLIN CLUB—North America

HOT TRAKS

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Volume 5 Number 1

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Special Feature

An Update: The Inside Story On Which Cars Go With Which Locomotives.

By JEFF STIMSON
Special Features Editor

In an article in the Winter 1987 issue of HotTraks, there was a description of how to put together historically and functionally accurate trains from among the locomotives and cars currently available in the main Märklin HO and Z catalogs. I would now like to expand this to include the new items delivered for 1988.

The same format from the original article will be used, going by historical period and type of train. Where a category is not given, there are no new items for it.

(Continued on Page 2)

Save 50%
On 1989 New Items Video!
See Depot For Complete Details.

EPOCH I

HO

Commuter Passenger Train

#4206. Goes with #3109/#3309 locomotive and #4207, #4208, #4209 for Berlin commuter train, usually found only on those trains serving the line to Potsdam and carrying officials of the royal court.

#4781. Although a freight car, this refrigerator car was lettered for the City of Berlin's welfare program. To ensure the delivery of adequate supplies of milk for newborn infants, it was often tacked onto the end of the commuter trains going into the city.

Express Passenger Train

#4213/#4214. Completes the Württemberg train introduced last year (#3311/#3511/#3611 locomotive and #4210, #4211 and #4212 cars).

EPOCH II

HO

Freight Train

#4634. Intended as companion to #4697 flat car with brakeman's cab and pivoting transport cradle, it was used for hauling lumber; also can be used in any freight train of this period.

Commuter Train

#4206. The train described above in Epoch I would also fit into the early part of this period.

Express Passenger Train

#3318/#3518/#3618. Locomotive and the #4238 Rheingold passenger car set form the most elegant and luxurious long-distance express train Germany was to field in the period between the two world wars and the only serious rival to the Orient Express in exclusivity. The colored bands on the locomotive's smoke stack signify that it was used exclusively on the Rheingold.

#2660/#2860. Although the class E 52 electric locomotive was more likely to be seen in real life pulling an ordinary fast train (Eilzug) or even a commuter train, this train is a good example of the staple express train of the 1920's with the locomotive still in the paint scheme of the former Royal Bavarian State Railways. The #3092 Bavarian Pacific would also be at home pulling this train over non-electrified routes.

Z-GAUGE

Express Passenger Train

#8109/#9108. The Orient Express, clearly the best known foreign train in America, has provided a setting for numerous movies and novels. Some early criticism was heard that the locomotive was not correct for this train. Actually, the Orient Express ran through at least seven countries during its journey from Paris to Constantinople in Turkey, with a change to the locomotives of the new country's state railroad at every border crossing. Many countries received German locomotives and rolling stock after World War I as reparations under the Treaty of Versailles and the Pacific steam locomotive in this set was originally the class S 3/6 of the Royal Bavarian State Railways.

EPOCH III

HO

Freight Train

#3304/#3504/#3604. A typical steam tank locomotive used in switching maneuvers in yards and for short transfer operations, could also be seen in switching operations for passenger cars.

#3608. Unique and curious diesel switch engine from a prewar design, without a doubt the smallest locomotive Märklin has ever attempted; used for freight and passenger switching duties.

#2861. A train all by itself, but the cars could be included as a unit in regular freight trains.

#4682. Can be used in multiples as a unit train or in regular freight trains.

Z-GAUGE

Freight Train

#8805. Considerably improved version of the #8800 with full electrical pickup on all wheels, for both freight and passenger switching duties.

EPOCH IV

HO

Freight Train

#4710. A decidedly utilitarian, functional box car in the latest all-welded design, appropriate for any modern European freight train.

#3553/#3654. The class 120.1 are both freight and passenger units and are thus included under both headings, appropriate with any of the cars listed in the original article for this period.

Commuter Train

#4258, #4259, and #4260. As described below, the latest color scheme for City Bahn commuter trains, appropriate locomotives are any listed under this heading in the original article.

Express Passenger Train

#2662/#2862. This train is included under this heading although two of its cars are actually commuter cars. The colors for the individual cars have been discussed at length in *HotTraks* number 3 for 1988 and the designations will be repeated briefly here:

Red/Pink Window Band: Intercity/Eurocity express.

Blue/Light Blue Window Band: Interregio express.

Turquoise/Teal Window Band: City Bahn commuter train.

Orange/Light Orange Window Band: S-Bahn commuter train.

Expect to see cars in these colors offered separately in the next few years along with more locomotives in the new all red paint scheme with the white "bibs" such as #3553, #3558, #3654 and #3658.

#3558/#3658. The latest color scheme for the class 103 electrics, in this writer's opinion, is nowhere near as effective as the original TEE red/cream colors. Can be used with all cars listed under this heading in Epoch IV in the original article as well as #4224 and #4225; there will be several years of overlap with interesting mixtures of old and new colors as the DB gradually repaints its rolling stock.

#4224, #4225. Newest open seating cars for Intercity/Eurocity trains, can be used with all engines and cars in Epoch IV in this and the first article.

Switzerland

#4218, #4219. Latest color scheme for the Bern-Lötschberg-Simplon Railroad, a privately owned line through the Alps to Italy. Can be used with any of the Swiss locomotives listed under this period in the first article, in mixed expresses with regular SBB passenger cars, and with the new #4189 Italian coach (see below) in cross border traffic.

#4199. Privately owned by the Mittel-Thurgau travel agency, can be used with regular SBB Swiss cars and locomotives to recreate the tourist excursion trains that operate over the Gotthard Pass to Italy.

Italy

#4189. Latest color scheme for long-distance Italian cars, can be used as described above in the Swiss section. The new Italian electric locomotive can be used with these cars if you stretch your imagination, but it is more properly used in commuter operations.

#3162. See comments above.

Belgium

#3133. A general purpose unit which can be used with the #4166 coach as well as those Belgian coaches listed in the Export Brochure and also in freight trains, for which any of the cars listed in Epoch IV under freight trains would be appropriate.

Austria

#3160. The same comments apply to this locomotive as to the #3133. The appropriate Austrian passenger cars would be the #4149 from the main catalog and those units listed in the Export Brochure.

Z-GAUGE

Freight Trains

#8663. I don't have any direct information that each of the breweries in this set actually have such cars, but they make a colorful addition to a train and can be creatively used in any Epoch IV or late Epoch III freight train.

#8618. Use with all cars already listed for Epoch IV freight trains in the first article.

#8657. Belongs in a maintenance train with an #8804 or #8864 locomotive and cars such as #8622 and #8624.

Commuter Trains

#8112/#9112. Newest color scheme for railbuses used in commuter and branch line operations on the Chiemgau line.

#8878. Appropriate commuter cars for this locomotive are: #8716, #8717 and #8718.

Express Passenger Train

#8878. Appropriate cars are: #8722, #8721, #8723 and #8720.

Intercity/Eurocity Express Passenger Train

#8111. The same comments apply to this set as to the HO version (#2662/#2862) except that the appropriate cars to be used with it would, of course, be found in the Z-gauge section of the first article.

#8848. Same comments apply as to the #8553/#3654; see Z-gauge sections for appropriate cars.

#8867. Same comments apply, as to the #3558/#3658; see Z-gauge sections for appropriate cars.

#8878. This locomotive would actually see more work in commuter and ordinary express service than in IC/EC service, but there is one line, only partially electrified from Munich to the Swiss border, that does have IC/EC connections where you would see this unit in operation. For appropriate cars, see Epoch IV for this section in the first article.

Switzerland

#8847. The latest paint scheme for the Re 4/4 IV series with its slogan promoting the plan to improve Swiss rail service by the end of the century. Appropriate cars are to be found in this section in Epoch IV in the first article.

Corrections to the first article

Under Epoch IV, TEE/IC/Eurocity Passenger Train for HO the locomotives and cars should read as follows:

- Locomotives: #3074, #3075, #3357, #3657, #3153, #3653, #3042
- Cars: #4112, #4085, #4089, #4087, #4092, #4154, #4147, #4096, #4095, #4098, #4097, #4153
- Note: TEE trains have 1st class cars only.

Under the same Epoch, Express Passenger Train for Z, the first car should read 8722, not 8872.

Märklin Featured On The "Today Show"

Märklin trains, in particular the Märklin Digital System, were featured on the NBC's "Today Show" as one of the most exciting and unique gifts of the 1988 Christmas season. The special segment aired Monday, December 19, 1988. This photo is of the Digital layout featured on the show. Pictured, from left, are Bryant Gumbel, show co-host, Fred Gates, president of Märklin, Inc., Jane Pauley, show co-host, and Dr. Thomas Catherall, Digital consultant for Märklin, Inc.



Educational Programs

Märklin Is Going Back To School—Again!

Märklin is headed back to the classroom! To Hill View Elementary School in Salt Lake City, Utah, where the Märklin Digital System is being used to give students hands-on experience in the practical application of technology and academic principles learned in the classroom.

In a program called The Computers & Technology On Track Project, students are challenged to construct, program, and operate a Digital transportation system built on an 8'x16' layout, which is a replica of the system now under construction in the Salt Lake City area. With a networked bank of 20 computers, the system offers unlimited operational program design possibilities, from single-train repetitive loops to complex, interrelated, multiple train schedules with built-in fail-safe controls to prevent accidents. Even the train is special. It features clear plastic casings so the students can study the operational aspects of a working train. (This train is not available commercially.)

Märklin believes this project presents a tremendous opportunity for helping young children learn and understand transportation, history, and how cities and towns are built, as well as teaching older children about electricity, physics, science, and computers. Story problems in mathematics and geometry come alive when they can be visualized on the working train system.

For instance, a sixth grade mathematics scenario transforms the computer's color monitor into a grid display for solving basic geometry problems. Utilizing a mechanical engineering story problem, with the newly-learned geometry concept, the students get valuable hands-on experience testing the concept with routing trains through local landmarks and geography.



This two-way communication between computers and trains opens up programming opportunities in decision making and problem solving for students. The interactive group activity means that students participate together, cooperating, sharing, and teaching each other. They refine their language skills and learn the importance of correct communication in a highly motivated yet relaxed, non-competitive atmosphere. Märklin is proud to be a partner in the On Track Project, and to be a leader in the development of model trains as an educational resource.

This Digital System layout is being used to help students at Hill View Elementary School in Salt Lake City, Utah, develop their problem-solving and communication skills (see story). The Digital System was donated by Märklin, Inc. Looking over the layout are, from left, Dr. Thomas Catherall, Märklin's Digital consultant, Dieter Waegner, of the Märklin Club, Brent Peterson, president of the Hill View PTA, Dr. Paul McCarty, Hill View principal, David Tanner, of the Märklin Club, and Frederick Gates, president of Märklin, Inc. Three Hill View students are also pictured.

Special Feature

Pantographs: Use One, or Both?

By JEFF STIMSON
Special Features Editor

Electric locomotives are equipped with a spring-loaded device to maintain electrical contact with the catenary wire—the pantograph. Most European locomotives have two pantographs and a frequently asked question is: Which one do you use, the front, the back, both? The current Märklin catalog shows all of its units with only one up, but photographs of the prototype show locomotives with any of the three situations described above. What is the rule?

In the prototype, locomotives whose pantographs have only one contact strip for the catenary wire, such as Märklin #7207, are operated with both pantographs, or *pans*, up. This applies to systems

powered with alternating current (AC) or systems run off direct current (DC).

Locomotives with pantographs having a double contact strip, both single arm and double arm designs, are generally operated with the rear pantograph up. Examples of this are Märklin #7218, #7219, and #7247. Exceptions to this are the following:

Freight trains with a tank car, hopper/gondola loaded with coal, or any other car with freight liable to catch fire from a spark generated by the pantograph in contact with the catenary wire and directly behind the locomotive, are all operated with the front pantograph up. Commuter trains with a cab control car directly behind the locomotive (for whatever reason) are also operated with the front pantograph up, such as Märklin #4160, #4185, #4257, and #4260.

When locomotives are being doubleheaded over mountainous routes, the front pantograph on the lead unit and the back pantograph on the rear unit are raised. When ice or frost builds

up on the wires during bad weather, both pantographs will be raised on newer locomotives to ensure adequate electrical contact.

Trade Shows

Following is a list of the trade shows we'll be attending this year. Mark your calendar for those in your area. If you're able to attend, be sure to stop by our exhibit.

JULY/NMRA 1989 AstroRail Convention & Train Show

Astroarena Exposition Center
Houston, TX

Members Only Show Hours

Friday, August 4—6 to 10 p.m.

Show Open To Public

Saturday, August 5—10 a.m. to 6 p.m.

Sunday, August 6—10 a.m. to 6 p.m.

NOVEMBER/Chicago Model & Hobby Show

O'Hare Expo Center, Chicago, IL
November 2nd-5th

Basic Signaling Practices Of The Deutsche Bundesbahn

By **CARL WEAVER**
Contributing Editor

As on a prototype railway system, signals on your model train layout are an essential feature for controlling several trains in a safe and efficient manner. A locomotive engineer must bring his train to a halt when he sees a signal that indicates "stop." A signal indicating stop could merely be telling a train in a station to wait for the correct time of departure. But, signals have a more important function too: that of preventing rear-end or head-on collisions between trains. To accomplish this, mainlines are separated into blocks. Each block is controlled by a signal at its entrance. When the block is occupied, the signal indicates stop. When the block is clear, the signal indicates proceed.

Märklin Offers Signals From Two Eras.

Two railroad eras are represented by the signals available from Märklin. The #7000 series signals of HO, the #8940 series in Z-gauge, and the #5611/#5612 in I-gauge are all of the semaphores and target type from the age of steam locomotives. Semaphores and targets were used because the lighted portions of the signals could not be seen in the daylight. Although many of these signals are still used in Germany, the Deutsche Bundesbahn (DB) began a period of intense modernization in 1965.

This modernization program included the installation of a family of color light signals, which Märklin offers in its #7200 HO series and the #8939 in Z-gauge. (A color light home signal from the pre-modernization period is represented in HO (#7188), but it's not a prototypical model.) The new color light signals are very bright for day and night usage, as well as under bad weather conditions. In addition, they have been designed to pass on more information to train crews, standardize signal indications throughout Europe, and better accommodate the higher speeds of modern trains.

What Are the Different Signals Used For?

For simplicity, signals can be categorized into five groups:

GROUP 1: SIMPLE HOME SIGNALS

These signals are the most important and should not be missing from any model railroad layout. Group 1 signals are those that tell the locomotive crew to either stop the train, or proceed at speed because the way ahead is clear. Technically, these signals are known as "home" signals; a typical station should have at least two, one for each direction on a single track with no siding. Group 1 home signals are also used on mainline tracks as block signals where there are no sidings or branch line entrances. The simple home signal has a single two position semaphore or,

in the case of the color light signal, indicates only a single red or green light.

GROUP 2: COMPOUND HOME

Although Group 2 signals are also known as "home" signals, they are different than Group 1 signals because they have double semaphores. Or, as in the case of color light signals, the semaphore has a third light, which is yellow. Group 2 signals tell the locomotive crew to stop the train, proceed at speed, or proceed slowly with caution. They're also used to indicate when a train can be switched off the main track, or near stations where trains can be diverted to either direct or alternate routing upon entering or leaving the terminal area.

GROUP 3: DISTANT SIGNALS

Each distant signal is an early warning indicator that provides the locomotive crew with two important pieces of information about the next signal down the line. First, it tells what the next signal indicates and warns the crew to prepare to stop, slow down, or proceed at speed. Second, the type of distant signal is an indication of what type of home signal is next and whether a route diversion is possible. It is important when buying signals for your layout, that you match a distant signal with the correct home signal. The proper match is shown in the Märklin HO catalog. Often, a distant signal is positioned directly in front of a home signal, and is matched to the next signal down the line and not the one that is directly in front of.

GROUP 4: MISCELLANEOUS

STATION & YARD SIGNALS This group of miscellaneous signals provides instructions to locomotive crews in a terminal area. The first is a block signal that is used in yards or stations to indicate whether specific tracks are open or closed. This signal restricts switching operations and keeps local traffic off of tracks that are about to be used by through trains. The steam era version of the block signal is a black diagonal inside a rotating white circle outlined by a black square. The modern version of the block signal is a combination of four red and white lights.

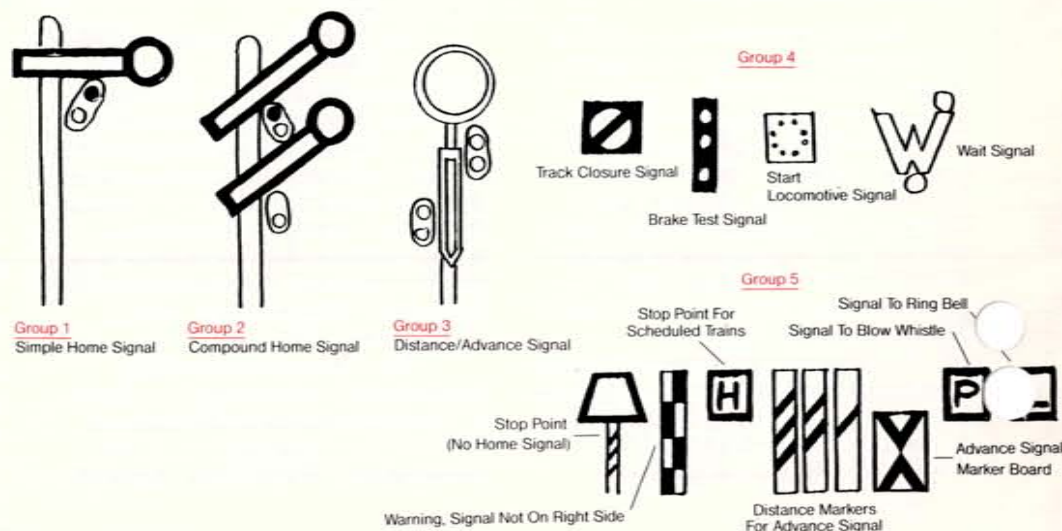
Three other Group 4 signals (not available from Märklin) include: 1) a Brake Check Signal with three vertical white lights to guide a locomotive crew through a three-step brake test; 2) a Departure Signal made up of a small circle of eight green lights to tell a train crew to start their locomotive when it is close to departure time; and 3) a Wait Signal with two diagonal yellow lights and lighted "W".

GROUP 5: SUBSIDIARY SIGNALS

These signals are actually a series of unlighted warning boards in various shapes and sizes which provide information or instructions to locomotive crews. Subsidiary signals include a Trapezoid Board mounted on a diagonally striped mast to show where the train must stop at a station with no home signal. Another subsidiary signal is the Chessboard which is used to warn that the next signal is not immediately to the right of, or above the track. The Stop Board is an example of a subsidiary signal that is used in conjunction with home signals. This signal is a black "H" and is found on station platforms and indicates where the leading end of a scheduled train is to stop.

The most common subsidiary signals are the Distant Signal Markers that precede the distant signals. As a rule, there are normally three of them and they are only installed on main lines. The last marker stands 100 meters from the distant signal while the preceding two are spaced at 75 meters. Another important subsidiary signal is the Distant Signal Marker Board (popularly known as the "envelope") that is placed immediately in front of a permanently installed distant signal.

At this point, I have listed the most important of the subsidiary signals. There are too many to list them all. But there are two more that you may need on your layout; a black "P" (Pfeiffafel) on a square white board to tell the locomotive engineer to blow his whistle and a black "L" (Läutetafel) on a square white board to have him ring his bell.



Building A Z-Gauge Layout Part Two: How To Plan

By RILEY O'CONNOR
Contributing Editor

Once you recognize the value of layout planning, and know what tools are available to help you, how do you plan?

As mentioned in Part 1, layouts which hold the greatest interest are the ones which have a central theme, a reason for being. Early train sets usually included just a circle of track. Since going around in a circle can be pretty drab, some sets began incorporating two pieces of straight track to create an oval (such as is in the Z-gauge starter sets). The oval can become dull, too, but adding a station along one edge of the oval gives the train a reason for being. Add a turnout (such as #8566) to create a siding, and the train stops to load and unload passengers and also backs up to leave freight. Add a styrofoam tunnel on the far side of the oval and the layout suddenly gets bigger.

We are all beyond the styrofoam tunnel stage, but this does illustrate certain concepts. The central theme of such a layout is the station, the track switch and siding add operating interest, and the tunnel makes the trains disappear. This "disappearing act" makes a layout seem to be much larger, since you don't see the train chasing its tail. Such a disappearance can be done with overpasses and bridges, too. What is important is that anyone watching your trains in action is not able to see the full train all of the time.

Ideas for layout design can come from a variety of sources. If the central theme of your layout is a particular structure, such as a station or industrial

area, then the track design will follow. The size of the space available for layout construction also is important. In your planning, pieces of cardboard cut to scale size can be used with the track planning template (#0212) or game (#0232) to represent the space occupied by these structures. The dimensions are available in the manufacturer's catalogs.

You can also refer to track plan books. The new Märklin layout book (#0295, which is not yet in print) and the older Märklin layout book (#0292, now out of print, but still available) feature different Z-gauge layouts. The #0292's layouts reflect an older approach to design where the trains are presented in a very formal, almost toy-like fashion. Furthermore, some track pieces are not correctly identified (originally, the uncoupler and the straight circuit track were 110mm long, and track switches were sold in pairs only). However, with a little modification, such plans are still useful. The #0295 layout book will feature all new layout designs. Layouts published by other sources are also helpful, but you may encounter certain pieces of track, such as a 90° track crossing, which are not made commercially in Z-gauge.

You can consider real railroad track situations, too. From the safety of a nearby highway bridge or hillside, study how the railroad routes its trains. Their tracks exist to move trains efficiently from point to point. The different routes let the railroad pick up and deliver its freight, the source of the revenue that lets the railroad exist. Giving your railroad a reason to exist will ensure your continued enjoyment.

modeling, including the economics of the area. For instance, a Mercedes looks out of place at a small farm house.

What follows is a list by era of some of the types of cars you might choose to use for several eras while modeling North and Central Europe.

1920 through the 1930s: In the big cities, there were plenty of cars, but horse driven taxis and buses were also present. The most popular models included Mercedes, Peugeot and Audi. For all practical purposes, American cars had not arrived in Europe. In the countryside, there were still many horse drawn carriages.

World War II to 1950: During the war, the people used horse drawn vehicles to save gas, but there were plenty of military vehicles running about. It took until the 1950s for most European nations to recover economically, so cars were limited. Many of the cars in use

New Recommendations Issued On Digital Rectifier & Relay

The Factory has announced changes in two of the recommendations made in the Märklin Digital Instructional Booklet, #0303. The first new recommendation affects the rectifier on page 131. You should now use model number: B 40 C 1500, which is available from most electronics shops. Equivalent Phillips and Radio Shack parts are: Phillips ECG 5318 200 volt 1 amp; Radio Shack 276-1171 100 volt 4 amps. The second change affects the relay found on page 142. The Factory now advises that it's best to replace it with Seuthe smoke generator No. 11.

1988 Discontinued Items

The factory has notified us that the following items are no longer available.

HO GAUGE

#3030, #3080, #3081, #3092, #3093, #3102, #3129, #4129, #3146, #3167, #3312, #3326, #3356, #3623, #3650, #4091, #4092, #4093, #4095, #4096, #4097, #4098, #4099, #4123, #4124, #4125, #4135, #4147, #4153, #4154, #4158, #4159, #4160, #4165, #4175, #4180, #4212, #4428, #4429, #4437, #4563, #4564, #4574, #4636, #4674, #4676, #4677, #4680, #4685, #2860, #2852, #2660, #2662.

Z GAUGE

#8106, #8111, #8115, #8116, #8117, #8172, #8621, #8638, #8641, #8663, #8670, #8671, #8672, #8673, #8674, #8741.

1 GAUGE

#5755, #5800, #5851, #5869, #5871, #5873, #5877, #5889, #5603.

In the newsletter of November 18, 1988 we informed you of the items for Märklin 1 gauge to be discontinued at the end of the year. In addition to these discontinued items, the entire Märklin 1 gauge rolling stock is to be technically reworked. This applies to the following cars.

#5801, passenger car #5870, stake car with ties
#5802, passenger car #5872, box car w/marker lights
#5804, compartment car #5874, high capacity dump car
#5805, compartment car #5878, telescoping car
#5808, baggage car #5879, Sinalco refrigerator car
#5850, gondola #5886, Dinkelacker beer car
#5853, stake car #5888, Kellogg's box car
#5860, box car

Update On Limited Edition Regional Freight Car Sets

The following chart indicates the suggested retail price for the 1989 Special Limited Edition Regional Freight Car Sets. The sets, as announced in your Winter 1988 HotTraks, are patterned after regional freight prototypes from across Germany. Sets will be produced in 1989 only. Orders will be filled on a first-come, first-served basis. With some sets due this month, we suggest reserving yours now.

Item Number	Description	Anticipated Delivery Date	Suggested Retail Price
4791	HO Berlin Regional Car Set	2/89	\$152.00
3302	HO Freight Locomotive w/Tender	2/89	\$395.00
3602	Digital HO Freight Locomotive w/Tender	2/89	\$410.00
4794	HO North Regional Car Set	4/89	\$129.50
4793	HO West Regional Car Set	6/89	\$129.50
4790	HO Bavarian Regional Car Set	8/89	\$110.00
4792	HO Southwest Regional Car Set	10/89	\$129.50
8691	Z Berlin Regional Car Set	2/89	\$128.00
8690	Z North Regional Car Set	4/89	\$128.00
8692	Z West Regional Car Set	6/89	\$128.00
8689	Z Bavarian Regional Car Set	8/89	\$128.00
8688	Z Southwest Regional Car Set	10/89	\$128.00

(Continued on Page 7)

Club Member's Article

Automobiles Add Authenticity To Your Layout

By D. G. SWITZER
Club Member #5590

Model automobiles, like other accessories and landscaping, can be used to add a tremendous amount of authenticity to your model train layout. But, finding "the right" automobiles is not an easy task. Especially if you're modeling a European layout. Most local hobby shops carry some models of automobiles. But you have to pick and choose carefully if you want to be true to the era and region you're

Trains That Talk To Computers

Part Two: Basics About Computer Data

By DR. THOMAS CATHERALL
Märklin Digital Consultant

Computers are really simple machines, or at least they are based on some very simple concepts. Computers work in what is called a binary mode, meaning they deal with two pieces of information (*bi* meaning two). This information can be the presence of an electrical current, or the absence of one. It could also be north magnetic polarity or south polarity. A switch can be on or off. All data is measured as either a zero or a one (0/1).

When we apply binary to a numbering system, we can only count to 1 with a single digit, not 9 as with decimal. In decimal, after 9 we have to move to two digits to get the next number, which is 10. It is the same with binary, to get the next number after 1, we move to another digit and so what we know as 2 in decimal looks like "10" in binary. In decimal, each place that a digit takes represents a value. For example: 1989 really means that we have nine single units, or 1s, eight 10s, nine 100s, and one 1,000s.

1,000	100	10	1
1	9	8	9
	9 x 1 = 9		
	8 x 10 = 80		
	9 x 100 = 900		
	1 x 1000 = 1000		
			1989

Each of the column representations in binary are different from decimal. In binary they are: 1, 2, 4, 8, 16, 32, 64, 128, etc. So a number in binary like 10110101 is equal to these values:

128	64	32	16	8	4	2	1
1	0	1	1	0	1	0	1
		1 x 1 = 1					
		0 x 2 = 0					
		1 x 4 = 4					
		0 x 8 = 0					
		1 x 16 = 16					
		1 x 32 = 32					
		0 x 64 = 0					
		1 x 128 = 128					
							181

And so we see that 10110101 in binary is equal to 181 in decimal. The eight binary digits shown above would form a byte of data. Each single digit is called a bit (for binary digit). Eight bits make a byte.

Many computers send data a byte at a time. The Märklin Digital System sends data a byte at a time also.

The byte of data can represent positions in the byte that are turned on or off, such as with the s88 module. Or, they can be numeric representations of other characters we are familiar with in our alphabet and computer/typewriter keyboard. For instance, the binary number representation for our decimal 13 is 1101 and is the same as the carriage return on the keyboard, and decimal 20 or 10100 in binary is the same as the space bar.

Interpreting s88 Data Sent From The Interface

Data coming from the Interface comes in bytes, and is sent to a place in the computer memory called the buffer. Our computer programs must pull those numbers from the buffer and analyze them. The following examples will use BASIC as the programming language since it is the easiest to learn and is found on most personal computers.

If we wanted to read the first s88 module on our layout we would send the command "193" to the Interface. The Interface would in turn fetch the memory of the two bytes in the s88 module and send them back to the buffer in the computer. That process in BASIC would look like this:

```
10 OPEN "COM1:2400,N,8,2" FOR OUTPUT AS #1
20 PRINT #1,CHR$(193);
```

Line number 10 is specific to the Macintosh™ computer, and would have to be changed to meet the specifics of whatever computer you're using. Its purpose is to open the serial communication port on the computer (the one with the picture of the phone). It must set the parameters for communication of 2400 BAUD, no parity, 8 bits to the word and 2 stop bits.

All this is for compatibility with the Märklin Interface unit and every computer does this differently. The communication port is for output only, we are sending data. Later we will do the same to set up a port for input so we can receive the data from the s88 module, but that port will have to have another number. This output port is #1 and so we print to #1 in line 20. What we are printing in line 20 is the character string "193"; CHR\$ means

character string. The literature from Märklin tells us that 193 will dump the memory of the first s88 module (see the *Users Guide to the Märklin Digital System*).

The Interface is now sending data as requested, and we need to get that data into the computer. But first, we must have a place to receive it, an input port. To achieve this, we must amend our program to look like this:

```
10 OPEN "COM1:2400,N,8,2" FOR OUTPUT AS #1
15 OPEN "COM1:2400,N,8,2" FOR INPUT AS #2
20 PRINT #1,CHR$(193);
```

We have added line 15 to open an input port as #2 and now we can receive the s88 data in the computer buffer and look at it. In order to see it, we have to take it out of the buffer and place it somewhere else and call it by some name or label (computer people call this "giving the data a variable"). For this program we will give the data the variable "DATA\$" and we will print it on the screen of the computer with the following program:

```
10 OPEN "COM1:2400,N,8,2" FOR OUTPUT AS #1
15 OPEN "COM1:2400,N,8,2" FOR INPUT AS #2
20 PRINT #1,CHR$(193);
25 DATA$=INPUT$(2,#2)
30 PRINT DATA$
```

Lines 25 and 30 have been added to our program and they bring in and print the s88 data. Line 25 inputs the data with the INPUT\$ command. The (2,#2) after INPUT\$ means that we only want to read 2 bytes of what's coming and it's coming in at port #2 as specified earlier in line 15. The command DATA\$ means that whatever is in the buffer will be put into the variable DATA\$. What comes in will actually be two numbers between 0 and 255. One for the left or first byte and one for the right or second byte. Line 30 will then print this data on the screen. If we left the program like this we would not get much meaning from it because what is printed on the screen in line 30 would make no sense to us. We need to convert the data to ASCII characters (our alphabet and numbers) so we humans can understand it. We also need to separate the two bytes and read them one at a time. The following program will do this:

```
10 OPEN "COM1:2400,N,8,2" FOR OUTPUT AS #1
15 OPEN "COM1:2400,N,8,2" FOR INPUT AS #2
20 PRINT #1, CHR $(193);
25 DATA $ = INPUT $(2,#2)
35 LEFT DATA = ASC (LEFT $(DATA $))
40 RIGHT DATA = ASC (RIGHT $(DATA $))
45 PRINT LEFT DATA, RIGHT DATA
```

Eliminate line 30 and replace it with 35 and 40 which assign to the variables "LEFTDATA" and "RIGHTDATA" the ASCII characters for the two bytes. Remember that the numbers in these two

variables are between 0 and 255. Line 45 will print the two numbers on the screen. Let's look at the byte on the left first; it will represent the plugs numbered 1 to 8 on the s88 module.

Each of the plugs are connected to one of the eight bits on the left byte, and remember that each bit has a value associated with it, as shown here:

	128	64	32	16	8	4	2	1
	1	0	1	0	1	1	1	0
plug	1	2	3	4	5	6	7	8

The plug assignments read from left to right, so plug 1=128, 2=64, etc., to plug 8, which equals 1.

If we were looking for a specific track detector to be activated and it was connected to plug #1 on the s88, we would want to put the program we wrote into a loop. By doing it this way, the computer will constantly monitor the s88 and, unless it reports the detector to be triggered, the program will go back and read the s88 again. The program would know that the detector was triggered, if the left byte was the number 128 since that is the value assigned to plug #1 where our track detector is plugged in. The following line needs to be added to our program:

```
50 IF LEFTDATA < > 128 GOTO 20
```

Now, line 50 looks for the detector plugged into plug #1 to be triggered, otherwise it goes back to line 20 and reads the s88 memory again. And if the variable "LEFTDATA" is not equal (< >) to 128 the program will keep looping. Once the variable reports the number 128, the program would proceed from here with instructions to the train to do some specific action, now that it has reached where detector #1 is located on the track.

Sometimes you might want to monitor the entire layout to see what has happened, in which case many detectors will report having been activated. The number that is reported by the variable LEFTDATA might be some value other than the ones shown above which are assigned to each of the plugs. Let's say, for instance, that the number in the variable LEFTDATA is 174. This represents the binary number 10101110 which is actually the data sent in the left byte from the s88 to the computer. In the chart below you can see what this means is that track detectors at plugs number 1, 3, 5, 6, and 7 are activated. The number 174 contains the numbers 128, 32, 8, 4 and 2; added, these equal 174.

	128	64	32	16	8	4	2	1
	1	0	1	0	1	1	1	0
plug	1	2	3	4	5	6	7	8

Determining which plugs are activated is easy. Start with number 174 and plug 1. Can 128 be subtracted from 174? Yes, which means plug #1 has been activated. The remainder of 174 minus 128 is 46. Can 64 (plug 2) be subtracted from 46? No, so plug #2 is not active. Can 32 be subtracted? Yes, making plug 3 active, and leaving a remainder of 14. This remainder of 14 means that plug 4, with a value of 16 is not active, but plug 5 with a value of 8 is active and that leaves us with a remainder of 6. Plug 6 is active with a value of 4, leaving a value of 2, which means plug 7 is also active. Our remainder is 0 which means plug 8 is not active. Had the remainder been 1, plug 8 would have been activated.

Test your understanding of this concept with the number 58. If you said that plugs 3, 4, 5, and 7 were active, you're correct. Once these concepts are understood, you can perform all sorts of magic with the computer and track detectors.

Interpreting Keyboard and Controller Data

This type of data is only available in ASCII mode from the 6023 Interface and will not help in the control of a layout. It is mostly used for educational programs and for experimenting with computer programming skills. The data that comes from the Interface is more complicated since it is conveying status of the Keyboard, engine address, functions, and speed. This article will not attempt to discuss these options, but they are documented in the Appendix of the latest printing of the *Users Guide to the Märklin Digital System*. If you buy a Digital Starter Set, instructions for ASCII mode with the Interface are included.

(Continued from Page 5)

Automobiles Can Add A Touch Of Realism To Your Layout

were Volkswagen Bugs that began to appear in the late 1940s.

The 1950s: This period is easy. Volkswagen Bugs, Citroen CV's, Fiat Minis and a variety of other Minis dominated the autobahns. There were the occasional luxury or sports cars, but keep these at a minimum since the economy was just starting to grow.

The 1960s: Still plenty of Volkswagen's, Citroen CV's, and Minis, but now, the Ford Taurus and other European-made Fords came in large quantity. "Sedan" models offered by many car manufacturers became very popular. VW Vans and Porsche 356's also gained popularity, and the occasional Ferrari was a possibility. Mercedes Sedans were fairly common by now.

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The 1970s to Today: The economic boom in Europe meant a boom in cars as well. BMW's, Mercedes, Volkswagen, Opel, Fiat, and all models of European Fords are everywhere. And every town has a few exotic models, but don't forget to include a couple VW Bugs and Citroen CV's; they never seem to go away. Another influence is Japanese cars, growing in popularity every year. Oh, by the way, American-made cars are still almost nonexistent in Europe.

Collecting model automobiles is a great sub-hobby for the model railroader, especially when your collection works hand-in-hand with your train layout. A good way to be sure your cars match your train layout is to find some photos of the region and time period you plan to model and compare.

Club Coordinator's Corner

New Diesel Railcar Announced for 1989

By **JOE BROWN**
Märklin Club Coordinator

One of the many exciting new items to be offered by Märklin in 1989 is an HO model of the German Federal Railroad's VT 628.2/VS928.2 diesel railcar set. The railcar is an upgraded version of the 628.0 and 628.1. After finding that the unit could be run more economically with just one operator, part of the cab became baggage space and the door was moved to just behind the engineer's seat. Colors also changed from the familiar blue and cream paint scheme of the early 1980s to the new commuter paint scheme of white with a 2-tone aqua blue stripe encasing the row of windows.

The railcar set consists of a diesel-powered railcar VT 628.2 and a light trailer car VS 928.2.

It has proven to be very economical in that it can transport a smaller number of people to lesser traveled routes more efficiently than a train consisting of a locomotive and separate coaches. This class of railcar is replacing the aging railbuses and older railcars classes 515 and 815. Because it is diesel-powered, the railcar has the extra advantage of being able to serve non-electrified regions. The speed and updated features such as automatic sliding doors with extra-wide access have permitted this vehicle access to the larger train stations of Germany as well as the smaller ones.

This model is a must for any Märklin enthusiast who desires to create a prototypical modern German layout. The railcar set also will be in Digital and featuring the new Five Star Propulsion System.

NEW! Märklin Club Binder Available Through Depot

At the request of Club members, we've decided to offer a 3-ring binder to help you save issues of HotTraks for future reference.

Beginning with this issue, HotTraks will come pre-punched for fast and easy insertion into the binder. The binders, which bear the official Club logo, are available through the Depot for only \$5.00. These are attractive, top quality binders reinforced for added durability.

HO Track Extensions Article Available

HO enthusiasts interested in reading about track extensions are advised to write or call me for copies of a two-part article from the Winter '86 and Spring '87 issues of HotTraks. The article offers a tremendous amount of insight and direction. A limited number of copies are available, so call now.

**Call the Märklin Club Toll Free—
1-800-772-2490
(Wisconsin residents call
1-414-782-6381)**



HO Diesel Railcar Set #3376. Also available with Five-Star Propulsion System, #3576, and in Digital, #3676.

Club Members' Q&A

Question: How can I modify my Märklin Locomotives with Telex (#3031 class 81 and #3065 class 260) so they will couple with the new close couplings?

—James D. Lowe, Member #0686
Award: Märklin Club Coffee Mug

Answer: Locomotives with Telex couplers have two projecting studs on each coupler (see diagram) which must be bent back out of the way or cut off so that these units will couple up with close coupler cars.



Question: Why is the Märklin magazine not printed in an English version?

—Alan N. Smith, Member #6264
Award: Märklin Club Coffee Mug

Answer: We certainly see the value in this and it has been explored. At this point, we do not have demand for the large quantity a printing would require to make it affordable.

Question: What is useful in creating snow for a winter wonderland for my layout? I noticed a photo of a backdrop like this in the 1986/87 Z-gauge catalog.

—William Harold Smith, Member #6692
Award: Märklin T-Shirt

Answer: Baking soda is used by a lot of modelers. When it gets dirty, it can be vacuumed up and new baking soda applied.

Question: Will Märklin produce a class 290 locomotive in Z-gauge and if so, when?

—John Kaminsky, Member #4720
Award: Märklin Club Coffee Mug

Answer: We'll pass your question on to the product development people at the factory with our comments and recommendations. However, information as to whether an item will be added or announced is, by policy, limited to those that have been formally announced at the International Toy Fair.

Members Participation

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**The Märklin Club
P.O. Box 795
Elm Grove, WI, 53122**

When applicable, be sure to include a list of all materials and time needed to complete a project. And be sure to include your name, address, phone number, club membership number, and your choice of rewards. The Club reserves the right to substitute rewards based on availability. If you select the shirt, also be sure to include your size.

HOT TRAKS

Märklin Club, P.O. Box 795, Elm Grove WI 53122

The Märklin Club is dedicated solely to serving the special interests of the Märklin enthusiast. Our goal is to help you get the most from your Märklin trains and model railroading; we want to make a fun hobby fascinating... for you.

To do this, the Märklin Club publishes one of the most highly informative newsletters in model railroading, HotTraks. The newsletter is your direct link to all the latest product news and developments from the Märklin Factory in Göppingen, West Germany. HotTraks is also a valuable resource for articles and features on a broad range of model railroading subjects.

Membership in the Märklin Club is renewable annually for only \$10. Your satisfaction is guaranteed. If at any time, for any reason, the Club or HotTraks is not as fulfilling or exciting as we promise, tell us why in writing and we'll refund your dues for the remaining months in your membership term.

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