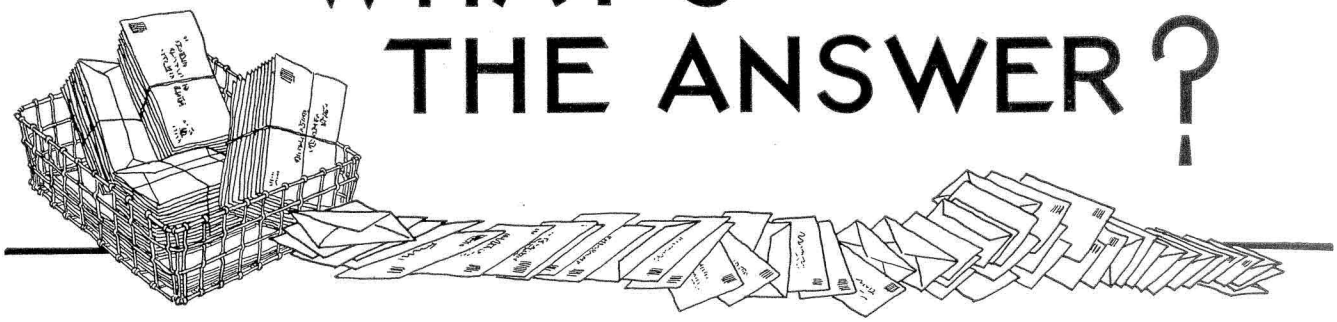
WHAT'S THE ANSWER?



Preparation of Signal Circuit Plans

"What routine is followed in the preparation of signal circuit plans?"

Typical Plans for Automatic Signals and General Schemes, but Separate Plans For Each Interlocking Plant

By George R. Scattergood
Chief Circuit and Locking Engineer, Pennsylvania, Philadelphia, Pa.

We use the A.R.A. symbols, with a written form of diagrammatic circuits. At one time we used the nomenclature circuits, but found that they did not quite suit our requirements. Our plans are inked in on tracing cloth, from which blueprints are made and sent out to our divisional forces.

Very rarely do we have interlockings which are identical as to the circuits. Therefore, each interlocking or block-station plan is prepared separately. Typical circuits are used for automatic signals and general schemes. We have, in rare cases, found a few of our interlockings to be identical as to circuits at the time of their installation, but as time went on, these plants were changed—but not all of them the same way—so that, after some little time, no two of these interlockings were identical so far as circuits were concerned. Experience has taught us to prepare a separate plan for each interlocking.

The above paragraph explains why we have not very much use for photostats, inasmuch as we have very few identical circuits. Our typical circuits, prepared on tracing cloth, are lithographed (8 in. by 14 in.) and copies of these lithographs are sent out to our divisional forces.

Complete plan for each location — Circuits first drawn on tracing paper

By Ralph C. Shay
Chief Draftsman, Delaware, Lackawanna & Western, Hoboken, N. J

The Lackawanna has just completed the necessary signal changes in connection with the electrification of its suburban lines, which involved the design and revision of approximately 500 sheets of circuit plans representing various forms of circuit drafting. Even though we had already developed what we considered a very intelligible and up-to-date circuit plan for both interlocking and automatic signals, we were not satisfied that a big improvement could not be made, and the result of a new effort on our part is what I consider—for its general utility, form and record—the best form of circuit plan developed to date.

We use the written form of circuit design, with the modification that all contacts are displayed in their true position and not indicated above or below the line, as in the form recommended by the A. R. A. In the work mentioned above we prepared all of our circuits on tracing paper and made prints from same for checking; while awaiting this checking process, we prepared cloth tracings. If, however, the urgency in the field was imperative, we issued construction prints from paper tracings, but, in every possible case, we made an effort to issue final construction prints from cloth tracings.

Because of the fact that our circuit plans can be cut up in the field to supply a complete wiring plan for each location they can be distributed among several wiremen.

To Be Answered in a Later Issue

(1) To what extent should fuses be used in railway signal circuits? Should both sides of 110-volt power circuits be fused, or is a fuse in only one side sufficient? Are fuses of any value in track circuits?

(2) When laying out track circuits for a-c. floating operation, what factors restrict the length of the track circuits? Under ordinary ballast conditions, what is the maximum length of track circuit that may be operated by a lead storage cell?

(3) What tests are most suitable for the purpose of checking new A. P. B. circuits before putting the signals in operation?

(4) What are the arguments in favor of using a separate switch-circuit controller for each point of a switch in automatic signal territory?

(5) Should all relays be inspected at regular intervals? Can signal failures be averted by this practice? How often should this work be done? By whom? What should be the nature of such inspections?

(6) What does it cost per year to operate a switch lamp electrically from primary battery as compared with oil lamps? Is constant or approach control used and how is the control circuit arranged?

For each location we draw a full and complete plan; this form of plan also provides an invaluable utility in that it may be cut and placed in the signal locations for maintenance information. We have not used photostats to replace blueprints.

First Blue Prints, for Checking Purposes, Are Made from Translucent Orange Cross-Section Paper

By E. F. D. Rapelye
Chief Draftsman, Telegraph and Signals, Illinois Central, Chicago, Ill.

In this office, practically all circuits other than automatic block signal and train control circuits are penciled on translucent orange cross-section paper before inked tracings are made. This permits obtaining blue-print copies for checking and other purposes if such copies are required before the inked tracing is completed. Electric interlocking circuits are made on comparatively small sheets to permit binding the prints in book form.

Automatic signal and train control plans are of the continuous type and show the control circuits for each location, with references to standard plans for motor wiring details, etc. The circuits are traced in ink, on sheets of tracing cloth 16 in. wide by 10 ft. long, from typicals previously drawn on heavy orange cross-section paper. If prints are required before the completion of the tracing, photostats may be obtained from the typicals.

Practically all circuits are of the written type except in the case of some standard wirings and some typical electric interlocking circuits which are used to supplement the written circuits.

Detail Wiring Plans Are Used with All Special Wiring Detailed on the Line Plan

By Phillip P. Ash
Chief Signal Draftsman, Louisville & Nashville, Louisville, Ky.

It is first necessary to prepare a basic plan to work by, which we call the location chart of signals, showing the track arrangement and the proposed location of signals, together with the profile and alinement. This plan is drawn to scale, usually 2,000 ft. = 1 in., and is 4 in. wide and whatever length required. The plan is traced in ink on tracing cloth, and the location of all signals, switch indicators and cut sections is shown thereon in pencil. Then a print copy is carefully checked in the field, especially as to the location of signals with reference to visibility, grade and alinement, bridges and buildings, and special operating conditions. After this field check, the tracing is brought up-to-date and everything is inked in. This then completes a basic plan by which further development of circuit plans can be prepared. There is another use for this location chart of signals, and that is as a basis for estimating the cost of the installation, but this does not enter into the question at hand. This chart is now ready for the circuit draftsman and is his authority for the preparation of circuit plans.

Wiring plans or line plans are usually 12 in. wide by 48 in. long, the sheets being pasted for the whole division, forming a continuous plan. The line plan is an enlarged plan, a single line being used for the track and this plan is not to scale, but is drawn with the idea of presenting all information in a neat and orderly manner without crowding. The pole line, with all line wires properly tagged, is shown and where the signals are wired according to typical detail wiring plans the "DW" numbers are shown.

It would be a tremendous job to make the one plan cover all the wiring. Therefore, we prepare what we call detail-wiring plans or simply "DW" plans, which are assigned numbers as DW-1A, DW-2A, etc., and are referred to on the above wiring plans for use in wiring the cases. These wiring plans are made in book form, each sheet showing the complete wiring and tagging of all wires from the pole line or cable pole to the relays, signal motor, circuit breakers, lightning arresters and battery. Where it is necessary to deviate from the detail wiring plans, all special wiring is detailed on the wiring or line plan. All plans are checked before the installation of the work is started, blue prints being furnished to the men in the field.

At interlockings where the wiring is somewhat complicated, one or more sheets of written circuits are inserted on the line plans. At large interlockings, the written circuits are made up in book form, as detail plans would, in this case, be so complicated that they would not be understood by the men in the field.

"B. W. Process" Prints are Used Extensively in Lieu of Van Dykes

By H. W. Chevalier
Chief Draftsman, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.

Written circuits are used extensively for all types of interlocking plants, and a separate pole-line drawing is used where no parkway cable is involved between the home signals. This pole-line drawing shows also the location of the tracks and signals, insulated joints and fouling, shunt and jumper wires.

Pencil plans are used to a great extent for the preliminary plans or sketches, and, after a decision is made as to the type of signals and circuits involved, the final plans are inked on tracing cloth. In some instances where two or more signal locations are identical as to circuits, a complete typical layout is made for one, with suitable notes referring to the other identical locations, and vice versa.

We have not as yet gone into the use of photostats, as they are quite expensive when used on a large scale. We have, however, used a new type of print, which we had not tried out heretofore, and which is known as a B. W. Process print. We now use these prints exclusively for exhibits to accompany contracts on new installations. This "B. W. Process" print is taken directly from the tracing without the use of a van dyke and produces a very white print with dark brown lines; it is less expensive to make than the old type blue line prints taken from van dykes.

Wabash Uses Written Circuits Extensively—Detail Wiring Plans Are Penciled on Tracing Paper

By L. B. Yarbrough
Office Engineer, Wabash, Decatur, Ill.

Written circuits are used exclusively on circuit plans, but case diagrams and standard wiring plans of signals, wigwags, etc., are produced more in detail. Circuit plans are penciled on tracing cloth and inked in when a complete field check has been made. As we sometimes have very little advance notice to prepare plans for an installation, this method allows working plans to be ready as promptly as possible. Detail case-wiring diagrams are

penciled on tracing paper and are inked in or redrawn when the condition of the tracing demands it.

Individual circuits and case diagrams are drawn for each location, even if they are identical in construction, as the tracing of nomenclature necessarily differs in each location. On a construction program where the field construction forces were increased and the drafting forces were unable to supply them promptly with wiring diagrams, a scheme was developed of using vandyke prints for identical locations, with rectangles blocked out on the master tracing of the wiring diagram wherever nomenclature was required, in order to leave a blank space on the vandyke.

The individual nomenclature could then be applied to each vandyke print. By the use of this method, case diagrams were produced very rapidly. The nomenclature was the only thing that had to be checked on these plans, since the vandykes were produced from a master tracing.

The disadvantages of using this system, however, were that if any changes were necessary at that time, or in the future, the plans would have to be redrawn. Also, the life of a vandyke print is very short and all plans must be reproduced to keep a permanent record. Thus, it is seen that the only reason for using this scheme was to keep the construction forces supplied with working plans as they needed them. If permanent records are desired, these drawings must be reproduced.

F. W. Pfleging, signal engineer, Union Pacific, states that the following practice is followed on that road: Written circuits are used in the preparation of interlocking plans; all plans are inked on tracing cloth; standard plans are used for identical locations; brown non-fading prints being used.

Point Detector or Switch Circuit Controller for C. T. C. Switches?

"On centralized traffic control and similar installations, is it permissible to dispense with the use of a point detector in the power switch machines? Is the use of a separate switch circuit controller just as satisfactory? If a point detector is used, should it be connected directly to the point of the switch, or to the front rod?"

Prefers Point Detectors

By W. F. Zane
Signal Engineer, Chicago, Burlington & Quincy, Chicago, Ill.

My answer, based upon the experience I have had with power switch machines, is that in centralized traffic control and similar installations, the point detector is preferable to a separate switch circuit controller, because the point detector is a better designed piece of apparatus than is the separate switch circuit controller. By this I do not mean that a switch circuit controller does not function properly, but rather the point detector will wear longer in service due to its type of construction and operation and to the connection that controls it. Also, when the point detector is part of the switch machine, it is not necessary to use additional space on the ties for a separate switch circuit controller, which simplifies installation and maintenance considerably. When a point detector is used, it should be connected directly to the point of the switch, giving preference to the normal high-speed point.

I am not in favor of depending entirely upon a point detector or a separate switch circuit controller, as I believe that, from a safety standpoint, it is preferable to have, in addition, a lock rod which gives two checks on the position of the switch, namely mechanical locking of the rod and the action of the point detector.

Protection Against Improper Trailing Movements is Essential

By G. H. Dryden
Signal Engineer, Baltimore & Ohio, Baltimore, Md.

One of the major requisities of interlocking plants is that signals shall be caused to indicate Stop, unless the switches, derails and movable-point frogs in the route are in a position corresponding with that of their controlling levers, and locked. If switches which are not equipped with point detectors are trailed through and not moved again until a reverse train movement in a facing direction is made, derailment may result at the open point. A point detector, which may be an ordinary switch box connected directly to the switch point, should protect in such instances.

Connection to the front rod is considered equal to that of a separate connection. In either case the movement of the point when trailed through should be sufficient to open the SS and, indirectly, other signal circuits. Close adjustment of contacts must be maintained.

Point Detector Has Distinct Advantages Over Switch Circuit Controller

By B. J. Schwendt
Assistant Signal Engineer, New York Central, Cleveland, Ohio.

It is possibly permissible to dispense with the use of a point detector in power switch machines but I would recommend against it. The inclusion of a point detector in the machine has advantages which cannot be had if it is omitted. A separate switch circuit controller is not just as satisfactory as the arrangement wherein a point-detector is included in the switch machine, for the reason that such a point-detector not only is controlled by the movement of the point but also is an index that the switch machine is "over and locked." This necessarily applies whether or not the lock rod is used, as the locking is on the cam bar and is effective on the throw rod.

Where a point detector is used, it is of course desirable that it be connected in such a way, either to the switch point or to the front rod, as to produce the best result in indicating when the point is not in proper position for the safe movement of trains.

Point Detector Should Be Fastened Directly to Point of Switch

By L. S. Werthmuller
Assistant Signal Engineer, Missouri Pacific, St. Louis, Mo.

I personally believe that the use of a point detector is an improvement over the use of a switch circuit controller, but the point detector should be connected directly to a lug fastened to the switch point. This can, of course, be accomplished by attaching the detector rod to the same lug that is used for the front rod. This would also hold true if a switch circuit controller were used.