The step-by-step telephone switching system: Digit absorbing selectors

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Issue 1
November 26, 2024

ABSTRACT AND INTRODUCTION

Digit absorbing selectors in a step-by-step telephone switching system perform the same roles in the switch train as "regular" selectors except that, for certain values of the digit dialed into the selector, rather than hunting on that "level" for a switch in the next stage, the selector resets to its "idle position" and is prepared to receive the subsequent dialed digit and act on it (said to have *absorbed* that first digit). For certain kinds, the same thing might happen on that subsequent digit.

The most common use of digit absorbing selectors is to provide a more economical implementation of the switching system than would otherwise be needed to operate under the numbering plan in use.

This article describes several common types of digit absorbing selectors and how they work.

1 ASSUMED READER BACKGROUND

In this article I will assume the reader to have at least a basic knowledge of the step-by-step telephone switching system, how a step-by-step switching machine is organized, and the basic normal functions of the various kinds of switches (line finders, selectors, and connectors).

For the reader who needs to get or refresh that background, I suggest the article "The step-by-step telephone switching system: Overview", by this same author, probably available wherever you got this.

2 THE SELECTOR

In a step-by-step switching system, a switch called a *selector* appears in all stages of the switch train except the first (which is the *line finder*, by which a line wanting to place a call is "received" by the system) and the last (which is the *connector*, which makes the final connection to the called line).

From a dialed digit basis, in an ordinary step-by-step switch train (one not employing digit-absorbing selectors), each dialed digit except the last two is handled by a selector in one "stage" of selectors of the switch train. The last two dialed digits are handled by the connector.

Thus, the number of stages of selectors is two less than the number of digits in the telephone number.

3 ABOUT "TRUNKS"

We are accustomed, in the discussion of local telephone networks, to think of the term "trunk" as referring to:

- An *intraoffice trunk*, which leads from the originating part of the originating central office to the terminating part of the same central office, or
- An *interoffice trunk*, which leads from the originating part of the originating central office to the terminating part of a different central office.

But in discussing step-by-step switch systems, the term "trunk" has a broader meaning: a path that leads from an "outlet" on a selector level (of any stage) to a switch in the next stage (selector or connector).

In this article, I will use "trunk" to mean such paths.

Note that those actually include, but are not limited to, the two kinds of "trunk" spoken of above.

4 "REDUNDANT" DIGITS IN THE TELEPHONE NUMBER

4.1 Telephone numbers

Suppose that as of, say, 1954, in an imaginary modest size town, there were three telephone central offices (COs), each handling several thousand lines, all using the step-by-step switching system. The telephone numbers all had five digits, presented thus in the directory and such: 2-2368, 3-4511, or 4-7389.

The first digit was the *central office code* (CO code), indicating the central office that served that number. For the three central offices in this town, those were 2, 3, or 4.

So if a caller in the "2" central office dials 4-7389, the 4, which is handled by a 1st selector in the "2" office, causes that selector to choose an idle trunk (yes, in this case an *interoffice trunk*) to the "4" central office. There that trunk terminates in a 2nd selector, which receives the dialed digit 7.

That makes that selector extend the connection over a trunk to a 3rd selector, which receives the dialed digit 3. That selector extends the connection over a trunk to a connector, which receives the dialed digits 89 and makes a connection to the called line.

So the switch train in each central office in this example comprised *line finders*, three stages of *selectors*, and *connectors*.

4.2 Meanwhile, in larger cities

By comparison, a fairly large city such as Cleveland had so many central offices that a 2-digit central office code was needed to distinguish them. (It was not served by step-by-step equipment; this discussion is just to explain the evolution of the eventual uniform numbering plan.)

But those two digit central office codes were in fact “presented” in the directory and such in the form of a “central office name”, such as “Melrose”. So a number served by the Melrose office would be printed thus:

MElrose-0520

The capitalization (and often bolding), of the first two letters was a reminder that they were to be dialed, this of course being done by way of the now familiar assignment of the letters of the alphabet (except for Q and Z) to the digits 2 through 8.

Thus a person dialing the above telephone number would actually dial 530520.

This structure and presentation of the telephone number was called “2L-4N”, for “2 letters and 4 numbers” (“2-4” for short).

In the really large cities, such as Chicago, there were so many central offices that a three digit central office code was needed. This was done by an expansion of the scheme described above. So a hypothetical telephone number there would be printed thus:

COngress 6-2368[1]

So a caller calling that number would actually dial 2662368.

This structure and presentation of the telephone number was called “2L-5N”, for “2 letters and 5 numbers” (“2-5” for short). (That did not illuminate the fact that the first **three** characters were a “group”, the “CO code”; only the printed appearance was described.)

4.3 The adoption of a mandatory “2L-5N” numbering plan

By about 1955, the telephone networks of the US and Canada had almost completely adopted a uniform “local” telephone number size of 7 digits (to be presented in the “2L-5N” format) for all cities (regardless of the number of central offices involved). Adopting this for the telephone network of a city was a precondition for that city being able to receive calls via the emerging Direct Distance Dialing program, under which telephone subscribers could dial their own long distance calls (that previously having to be done through a *long distance operator*).

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[1] At an earlier time, that same telephone number would have been presented as **CON**gress-2368, the three letters “CON” being dialed in that same way.

Chicago was already there, with numbers such as **CO**ngress 6-2368. In Cleveland, the change to the user was small: the number **BO**ulevard 5569 became **BO**ulevard 2-5569. (That is not to suggest that the change to the central office equipment of the types then used in Cleveland was trivial; it was a massive change.)

4.4 Back to our hypothetical little town

From a technical standpoint, for our hypothetical little town, the central office code, heretofore a single digit, became three digits (the specific choice of which, and the name used to present part of such, was governed by many factors we need not learn of here).

Indeed this was a big dislocation for many of the users. But it was required for "progress".

Perhaps that transformation was as follows:

Former	New CO code	
CO code	As printed	As dialed
2	JEfferson 2	342
3	ORchard 3	473
4	JUniper 4	584

Thus the telephone number that was formerly 4-7389 was now technically 584-7389 (in terms of the actual digits that would be dialed. It was shown in the directory as **JU**niper 4-7389 (following the scheme that had been in use for many years in, for example, Chicago (and in a more compact form in Cleveland).

And from here on, I will speak of the central office codes as digits (which they actually are, and which is how the switches see them).

4.5 Implementation of the "2L-5N" numbering plan in step-by-step

Now if this change were implemented "in the obvious way", in each of our three step-by-step central offices, the existing stage of 1st selectors (which handled the old single office code digit) would have to be joined by two new subsequent stages of selectors (each stage handling a further one of the three digits of the new central office code).

This "three stage" portion of the switching machine (if fully "fleshed out") could have handled all 540 then-legitimate three-digit CO codes, yet here it only has needs to handle three.

So this seems to be a sledge hammer used to kill a fly.

Of course, here, those three stages would not have to be "fully fleshed out", but they would require, at the least, two new selector frames and quite a few new selectors (and a lot of labor to install and connect all that).

4.6 To the rescue

To the rescue in this matter comes the *digit absorbing selector*. At each central office, we replace all the 1st selectors with digit absorbing selectors of a certain type. This is “straightforward”: the new selectors are physically and electrically interchangeable with the original selectors, and just “drop in” and “plug in”.

Assuming the numbering system described just above, these digit absorbing selectors are “programmed” (we will see later how that is done) so that if the digit they receive is **other than** 2, 3, or 4, the switch, rather than hunting along the “level” reached from that digit for an idle trunk to a switch in the next stage, will instead reset to its “idle” position and wait for to the next digit dialed. This is said to be “absorbing” that digit.

Now suppose that our caller indeed dials 584-7389. The dialed 5 steps the switch to level 5, and the switch resets (because that is not level 2, 3, or 4), absorbing that digit.

The dialed 8 steps the switch to level 8, and the switch resets (because that is not level 2, 3, or 4)), absorbing **that** digit.

But the when the 4 is dialed, the switch goes to level 4 and is not reset. It hunts along the “outlets” on level 4 for an idle trunk to the 584 office (formerly known as the “4” office). **This is just what level 4 of the 1st selectors did before the change.** There had not even needed to be any “rewiring” of how the trunks to the various offices were accessed by the selector levels 2, 3, and 4.

4.7 Busted at the blackboard!

Now, the astute reader may say, “Whoa, professor. That only worked out because of the specific new central office codes you assumed in the story.” Quite so, I confess. For convenience, I cheated and assumed that they had been assigned such that the first two digits of the CO code were never 2, 3, or 4.

But the wonks who assigned all the new CO codes in the *numbering plan area* (NPA–what got an “area code”) of interest, within which all CO codes had to be distinct, might not have been able to provide that convenience to our little town.

4.8 A less-contrived example

Suppose that instead, the table of CO codes looked like this:

Former	New CO code	
CO code	**As printed**	**As dialed**
2	ADams 2	232
3	GArfield 3	423
4	DAvis 4	324

Now the ploy I described above would not work. If the digit-absorbing selectors we set to absorb all the digit values found in the first two positions of the CO codes (here that would be 2, 3, and 4), then when the "actually important" 3rd digit of the CO code came along (always 2, 3, or 4) it would also be absorbed, and the call would be doomed.

But there are "more clever" kinds of digit absorbing selectors that can work here. One kind (described in Section 8.6) could be "programmed" as follows for the situation I described just above:

- When first activated, if the digit received is 2, 3, or 4, absorb that digit (reset the switch and make it wait for a subsequent digit).
- If that subsequent (2nd) digit is 2 or 3, absorb that digit (reset the switch and make it wait for a subsequent digit).
- For that next (3rd) digit, the digit dialed is always effective (never absorbed).

5 THE NORMAL POST SPRINGS

I have spoken above of "programming" a digit absorbing selector to give certain actions only when a certain digit has been dialed, or in some cases I have spoken metaphorically of "lists" of digit values for which the digit should be absorbed.

This is actually implemented by an electromechanical assembly described as the "normal post springs", with which all digit-absorbing selectors are equipped.[2]

This consists of two or four sets of contact springs, all mounted on, and descending from, a metal block that is mounted at the top of what is known as the *normal post* of the switch, a fixed circular shaft extending upward from the switch mechanism frame. (Every step-by-step switch has a normal post, but here it is longer than usual so as to have a place to which to fasten the normal post spring assembly.)

We see the arrangement in figure 1 for the arrangement that has two sets of normal post springs.

[2] Other special types of selectors, certain special types of line finder, certain special types of connectors, and all selector-connectors (a special kind of switch used in small private branch exchanges) also have normal post spring, used to control a wide array of special functions based on the digit(s) dialed.

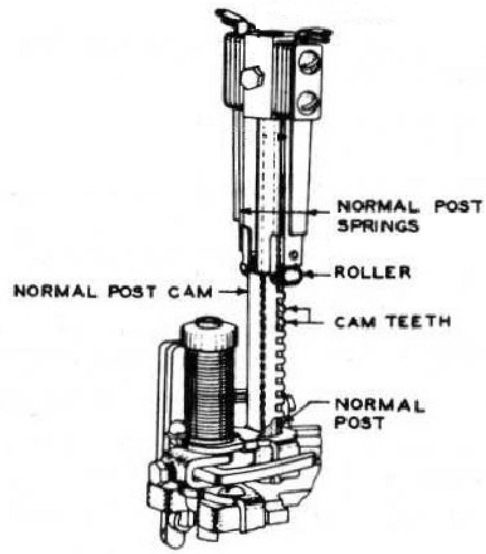

Figure 1. Normal post springs

The *normal post* itself gets its name from the fact that with the switch shaft in its idle (formally, "normal") position (from a rotational standpoint). a lever on the top end of the shaft, regardless of the vertical position of the shaft, rests someplace on this post to precisely establish the angular position of the shaft.

There is also a plate at the top of the shaft in which the shaft is free to rotate but which also rises and falls with the shaft. Its angular orientation, however, is fixed, since a slot on it rides on the normal post.

The main job of that plate is that the "fixed" end of the helical spring that urges the shaft toward the "normal" rotational position is fastened to that plate, and the reaction to its torque is passed to that plate and thence to the normal post and thence to the frame.

But if the switch has a normal post spring assembly, there is also clipped to that plate a *normal post cam*. In the case of a normal post spring assembly with two spring sets, this is a channel-shaped sheet metal piece. In the case of a normal post spring assembly with four spring sets, this is an H-shaped assembly of two channel-shaped sheet metal pieces spot welded back-to-back.

The two (or four) "fins" of this cam are each shaped into ten round-end "tabs", one for each "level" to which the shaft may be directed by the digit dialed into the switch. These tabs can individually be bent outward.

If the tab (on one of the fins) corresponding to a certain level is bent out, then when the switch is sitting on that level, the tab presses on a little roller at the bottom end of one of the normal post spring sets, operating that spring set; otherwise, that spring set is left non-operated.

Thus (if we have the "two contact spring set" form) this in effect provides a "table" which, for each of the ten levels to which the switch may be directed by the dialed digit, can return one of four "results": neither spring set operated, the left (L) spring set operated, the right (R) spring set operated, and both spring sets (L and R) operated.

If we have the "four contact spring set" form, for our purposes this can best be thought of as in effect providing two independent "tables" (the "front one" and the "rear one"), each of which, for each of the ten levels to which the switch may be directed by the dialed digit, can return one of four "results".

6 BLOCKING

Although actually a wholly separate matter from digit absorbing, almost all of the digit-absorbing selectors also offer a functionality described as *level blocking*.

Briefly, that means that the switch can be "programmed" so that if any of certain digits is dialed, the connection does not advance and the user is sent a tone sequence to advise of such (spoken of as that level being "blocked").

This is normally applied so that an invalid sequence of digits will lead to the caller receiving that tine signal top so advise.

7 "MARKING"

Often, in the detailed discussions to follow, for conciseness I will speak of the setting of the normal post cam to produce a certain behavior when the switch is sent a certain level as "marking" that level for that behavior.

8 DIGIT ABSORBING SELECTORS

8.1 General

I will describe here 5 "types" of digit absorbing selectors of which I am aware. The behavior for each type is summarized in a chart.

8.2 The “absorb repeatedly” type

Switch type: absorb repeatedly

NPS tabs bent L	NPS tabs bent R	Formal name	Action
		[None, but can be considered "normal"]	Selects idle trunk
L		Block	Step to end of level, return "overflow" tone
	R	Absorb [repeatedly]	Reset switch, accept subsequent digit
L	R	[Not assigned]	

NPS: normal post springs

First note that here, as in all the digit absorbing switches I will discuss, if for a certain level (and thus a certain dialed digit value) no normal post cam tabs are bent (a “setting” that has no formal name–it is considered to be “no setting”), then the selector operates in a normal selector fashion, hunting along the outlets on that level to find and select an idle trunk to the next stage.

If the switch goes to any level set for “absorb”, the switch will reset to its idle position and wait for another digit. So the digit dialed is ignored insofar as extending the connection (thus, is “absorbed”).

If level 5 is set for “absorb” [3], and we dial 5, the switch will reset (that is, absorbs that digit). If we dial 5 again, that digit will be absorbed again. Thus the “full name” of that level setting, and the name of the selector type.

Now assume that both levels 5 and 8 are set for “absorb”. We dial 5 and it is absorbed. We dial 5 again, and it is absorbed. We dial 8, and it is absorbed. We dial 8 again, and it is absorbed. We dial 5 again, and it is absorbed.

If the level reached is set for “block”, the switch begins to hunt over the outlets in that level in the usual fashion for a selector, but is forced to consider every outlet as busy, so it does not stop on any outlet.

After mindlessly passing all ten outlets, the switch arrives at “rotary position 11”. There, in the usual way for a selector, contacts stop any further rotary stepping and cause a tone signal to be sent back to the caller.

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[3] We can think of that as “absorb repeatedly”, the only type of absorption this type of switch offers

Such a tone signal is often generically (regardless of its actual composition) called "overflow tone". This term comes from the concept that when a switch is unable to find an idle trunk to the next stage, arrives at an "overflow" position that is beyond the positions for actual outlets. (No, that is not a particularly good term.)

In this case, often just ordinary "busy tone" is used (1 tone burst per second). In other situations, the same basic tone is used but interrupted at a cadence of two bursts per second (often called by civilians "fast busy"). "In the trade" it is sometimes called "reorder", the name of the same tone sequence as used in long distance operation. It is sometimes called the "all trunks busy" (ATB) tone, which is apt in this case.

8.3 The "absorb once" type

Here I must first introduce the concept of a "lock" state for the switch. When the switch is first seized, its state is "locked" It may later, on that same connection, become "unlocked".

Switch type: absorb once only

NPS tabs bent			Action if switch is	
			locked	Un-locks switch
L	R	Formal name	unlocked	
		None, but can be considered "normal"	Selects idle trunk	
			Selects idle trunk	
L		Block	Step to end of level, return "overflow" tone	
			Selects idle trunk ("normal")	
	R	Absorb [once only]	Reset switch, accept subsequent digit	U
			Selects idle trunk ("normal")	
L	R	[Not assigned]		

NPS: normal post springs

In this type of digit-absorbing selector, once the digit dialed is for a level set for "absorb" [4], that digit is indeed absorbed (and the switch remains receptive to a subsequent digit), and the switch is then "unlocked".

That means that for the next digit no absorption or blocking is in effect; regardless of the digit dialed, the switch hunts (in the normal way) for a trunk to a switch in the next stage. Thus the "full name" of that level setting, and the name of the selector type.

The story of "overflow" tone" is the same as in Section 8.2.

[4] We can think of that as "absorb once only", the only type of absorption this type of switch offers

8.4 The “absorb once or repeatedly” type

Switch type: absorb once only or repeatedly

NPS tabs bent			Action if switch is	
			locked	Un-locks switch
L	R	Formal name	unlocked	
		None, but can be considered "normal"	Selects idle trunk	
			Selects idle trunk	
L		Absorb repeatedly	Reset switch, accept subsequent digit	
			Selects idle trunk ("normal")	
	R	Block	Step to end of level, return "overerflow" tone	
			Selects idle trunk ("normal"	
L	R	Absorb once	Reset switch, accept subsequent digit	U
			Selects idle trunk ("normal"	

NPS: normal post springs

Again here we have the concept of the “lock” state of the switch.

Here, however any level can be set for either “absorb repeatedly” or “absorb once”. The significance of those are the same as described in Sections 8.2 and 8.3.

But to recap:

• If a level is set for “absorb repeatedly”, the digit is absorbed (the switch resets and remains receptive to a further digit). All “absorb” (either kind) or “block” settings remain in force for that subsequent digit.

• If a level is set for “absorb once”, the digit is absorbed (the switch resets and remains receptive to a further digit) and the switch is “unlocked”. Therefore no “absorb” (either kind) or “block” settings are in force for that subsequent digit. (See section 9 for further discussion of the terminology here.)

8.5 The “service code selector” type

This is a special version used in the context of access to the “traditional”“service codes” in a step-by-step central offices (such as 113 for Directory Assistance). That context is complex, and I will not cover it here. But briefly, this type of switch is usually set up so that a digit of 1 will always be absorbed, and initially all other levels will be blocked, except that after 1 had been dialed at least once, then other digit values will all be effective. Here is its chart:

Switch type: Service selector

NPS tabs bent: L	NPS tabs bent: R	Formal name	Action if switch is locked / unlocked	Un-locks switch
		None, but can be considered "normal"	Selects idle trunk	
			Selects idle trunk	
L		Block	Step to end of level, return "overflow" tone	
			Selects idle trunk ("normal")	
	R	Absorb [repeatedly]	Reset switch, accept subsequent digit	U
			Reset switch, accept subsequent digit	
L	R	[Not assigned]		

NPS: normal post springs

Again here we have the concept of the "lock" state of the switch.

This switch type differs from the "absorb once or repeatedly" type (as described in Section 8.4) in that a level can be set for "absorb" and when visited, whether or not the switch is locked, the digit is absorbed and the switch (if is was locked) is "unlocked" so for the next digit there is no blocking.

By way of comparison, in the "absorb once or repeatedly" type, only after absorbing a digit on the "absorb once" setting is the switch "unlocked".

8.6 The "2-digit" type

8.6.1 *General*

There is no concept here of the "lock" state of the switch.

There are four normal post contact springs (and thus four tabs on the normal post cam that can be bent out on any given level). These are designated based on two pairs (the front and rear pairs) and two contacts per pair (left and right).

8.6.2 *The chart*

Here is its chart:

Switch type: 2 digit

NPS tabs bent			
L	R	Formal name	Action
		[None, but can be considered "normal"]	Selects idle trunk
L		Block	Do not hunt, return "no such number" tone
	R	Absorb	Reset switch, accept subsequent digit
L	R	[Not assigned]	

NPS: normal post springs; for 1st digit, front pair; for 2nd digit, rear pair

The level" markings" conferred by the two front NPS tabs apply to the first digit received. The level" markings" conferred by the two rear NPS tabs apply to the second digit received. There is no concept of "unlocking" the switch based on the fist digit received.

If the first digit is absorbed, the switch remains receptive to a further digit. When that digit is received, the NPS tab settings in the rear set are in effect.

Recall that for the digit-absorbing selector types as described previously, when the level reached is set as "blocked", the switch is forced to mindlessly step over the level to rotary position 11, where a contact makes the switch return "overflow tone".

But in this switch, when a blocked level is dialed, the switch just stays put and a relay returns to the caller "no such number" tone. This was a special tone developed (in early 1941 or thereabouts) to clearly indicate that the caller had dialed an invalid CO code. It had a fundamental frequency that rose and fell over the range 200-400 Hz (albeit with a rich harmonic content) at a rate of one complete back-and-forth cycle per second.

8.6.3 *Application to a previous "dilemma"*

In Section 4.8 I posited a possible plan of CO codes that could not be dealt with using the simpler types of digit-absorbing selector, but can be dealt with by use a 2-Digit digit absorbing selector. For convenience, I repeat here that CO code plan:

Former	**New CO code**	
CO code	**As printed**	**As dialed**
2	ADams 2	232
3	GArfield 3	423
4	DAvis 4	324

We would set the NPS tabs in the **front** set (these control the action for the 1st digit received) to "absorb" for levels 2, 3,and 4. Thus if a caller dials (for the office code) 232, 423, or 324 (the only possibilities in this case), the first digit will be absorbed, leaving only 32, 23, and 24 to be “worked”.

And we would set the NPS tabs in the **rear** set (these control the action for the 2nd digit received, if any) to “absorb” for levels 2 and 3. Thus, as to the CO code, after the second digit was dialed, all that would be left to be “worked” would be the 3rd digit values 2, 3, and 4.

But in this type of switch, for the 3rd digit no special actions are in force for any level. Thus the switch would select, in the normal way, a trunk on level 2, 3, or 4, those leading to the ADams 2, GArfield 3, and DAvis 4 central offices, respectively.

8.6.4 *A small clinker*

First I note that step-by-step switches of whatever kind just mechanically “drop in” to positions on the shelf that can carry perhaps 10 switches. A mating contact spring arrangement automatically carries the connections from the switch to its wiring in the shelf.

Thus, if a switch misbehaves, it can just be lifted out of position and a replacement “dropped in”

A “regular ”step-by-step system *selector* is built on a “chassis” (my term; the formal term is “mounting plate”) that can accommodate up to 6 relays of the regular type plus one smaller relay (7 altogether).

In contrast, a “regular“ *connector* is built on a taller “chassis” which can accommodate up to 10 relays of the regular type plus one smaller relay (11 altogether). Thus the mounting shelves for connectors are physically different from those used for selectors.

It was considered vital that all the digit-absorbing selector types have the same “chassis” as regular selectors. so they could be physically “dropped into” the same mounting shelves as the “regular” selector they replaced.

But when the 2-digit digit absorbing selector was developed (that being the latest type developed), the most practical circuit would have required 8 relays, yet there was only room for 7 on the chassis that had to be used.

The final plan was that 7 of these relays would be in the selector itself (as usual), and the 8th would be mounted on a bracket on the mounting shelf. A clever circuit trick was used so that there only had to be a single lead running between the switch and its “external” relay, so that only one of the spring contacts by which a switch connects to the shelf wiring had to be available for this.

Another issue is that th 2-digit digit absorbing selector, rather than forcing the return of the “all trunks busy” signal on a level that is blocked, are arranged to return a separate tone signal, “no such number”.

So if 2-digit selectors are to be emplaced, the power plant must be updated to generate this signal and it must be wired to all the relevant selector positions (perhaps all 1st selectors).

All this means that although I spoke glibly about “being able to just drop digit absorbing selectors in” to deal with certain schemes of expansion of the numbering plan to 2L-5N, where 2-digit digit absorbing selectors were needed, it would not be quite that simple.

9 ABOUT “ABSORB ONCE” AND “ABSORB REPEATEDLY”

In the descriptions of the various types of digit absorbing selectors, i used the terms “:absorb once” and “absorb repeatedly” for the behaviors that might be conferred on various switch levels, those being the terms used in most formal literature.

But like many technical terms, those names do not tell the whole story, and in fact suggest behaviors that are not really what happens.

For example, suppose that on a certain selector of the type described in section 8.4 we have levels 2 and 3 marked as “absorb once”, and levels 5 and 6 marked “absorb repeatedly”.

Now imagine that the selector, when first “seized”, receives the digit 2. The switch resets, (that is, absorbs the digit), awaits another digit, and “unlocks”. The selector next receives the digit 3. That digit is not absorbed (since the first digit “unlocked” the switch), **even though it is marked “absorb once”**.

In the next scenario, again assume that the selector first receives the digit 5. Again, that digit is absorbed, and the switch is not unlocked. Now the selector again receives the digit 6. Again, that digit is absorbed, and the switch is not unlocked. The second digit, 6 was absorbed, not because that digit value was entitled to be “absorbed repeatedly”, but only because the previous digit, of whatever value, was not marked “absorb once”.

So, to be very precise, the meanings of those two markings are as follows:

> “Absorb once” or “absorb repeatedly” means “absorb this digit only if there was not a previous digit marked ‘absorb once’.”

Said in the other direction:

> “Absorb once” means “absorb this digit and there will be no further digit absorptions (or blocking) for any level.”

> “Absorb repeatedly” means “absorb this digit (period).”

10 A NOMENCLATURE ISSUE

It turns out that popular digit absorbing selectors of the “absorb repeatedly” type (as described in Section 8.2) and the “absorb once” type (as described in Section 8.3) are considered ”variants” of the same “kind” of switch, and as such are defined by the same Bell Laboratories circuit schematic drawing. The difference between the two types is effected by apparatus and wiring options on that drawing. We would specify those options one way or the other when ordering switches from Western Electric).

The “name” of this kind of switch, as reflected by the title of that single drawing, describes this switch as “arranged to provide absorption once or repeatedly” (meaning that it could be built configured to provide one or the other).

The popular digit absorbing selector of the “absorb once or repeatedly” type (as described in Section 8.4) is covered by a different circuit schematic drawing. Its drawing title describes this switch as “arranged to provide absorption once only and/or repeatedly” (meaning that is could be programmed to do either on any given level).

The popular “2-digit” digit absorbing selectors’ formal name includes “arranged to absorb 1 or 2 digits”.

So we have to be very alert when considering these switches and the drawings that define them.

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