

Re: Parts Numbering Scheme

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- *From:* mroberds@xxxxxxxxxxxxxxxx
 - *Date:* Wed, 08 Jun 2005 05:52:05 GMT
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Roger Lascelles <despam_rklasl@xxxxxxxxxxxx> wrote:

>We are a small company, and we would like to implement a better components
>numbering scheme.

Here are the ways a couple of big companies have done it. I'm not suggesting that these are optimal for you, just giving some examples.

General Electric major appliance part numbers are (were?) of the form

W[A-Z][0-9]{1,2}X[0-9]{1,4}

The leading "W" is constant and I am told it stands for "white goods" – refrigerators, washing machines, etc. ("Brown goods" are TVs, stereos, etc... they had a leading "E".)

The second letter indicates what type of product the part is for. R=refrigerator, B=oven, E=dryer, H=washer, etc. X was used for common parts like screws, washers, and bolts that could be used in many different products.

The next two digits indicate a major subsystem or group of related parts on the machine. For example, in refrigeration, timers are 9, and compressors are 87.

The "X" was a fairly constant separator. Historically it was the only separator, but "J" and "M" have also been included in newer part numbers.

The last one to four digits are just a serial number to tell the parts apart – they don't encode any characteristics of the part. About the only thing you could tell from these numbers is that newer parts had bigger numbers.

People typically didn't pad the numbers (WR9X330) but the computers did (WR09X0330). The lookup was smart enough to accept either style and find the right part. The "canonical" form was all upper case, but as far as I remember, it was case insensitive... wr9x330 or wR9x330 would all be acceptable to the computer as the same part number.

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Volkswagen automotive part numbers are described at <http://www.type2.com/library/identifi/numsys.htm> . This system was probably originally designed with Hollerith cards in mind!

The parts list for an old Systron–Donner frequency counter I have shows parts with a leading letter and four or five digits. The leading letter mostly corresponds to the part type: (R)esistor, (C)apacitor (no distinction between ceramic, electrolytic, etc), (S)witch, X for sockets, (V)acuum tube, CR for diodes, etc. Integrated circuits and transistors seem to have all–numeric part numbers. The digits just seem to be assigned in order of use.

My response to a couple of other points that have been brought up:

Allowing upper case and lower case letters in your part numbers does double the number of possible values in each digit, but IMHO will drive you crazy. If nothing else, most existing part numbering schemes are case insensitive, and you may tend to confuse people if they assume your scheme is the same. I think it won't be obvious to a lot of people that an A0123 and an a0123 are two totally different items.

The two extremes of part numbering are probably an all–numeric part number that has no inherent meaning (73853), and an alphanumeric string that tries to describe everything about the part (RES 1K 0.5W 5% METAL FILM). Both of them will drive you crazy. The all–numeric ones are too easy to confuse with one another. The alphanumeric string only works if you rigidly enforce some standard when you're putting new parts into the system, which never happens.

One slight advantage to the all–number system is that these are easy to copy correctly over the telephone. An alphanumeric system is harder to communicate – was that a D123 or a P123 or a B123? – unless you can train people to use some kind of phonetic alphabet (Alpha Bravo Charlie, Able Baker Charlie, etc).

If you have reason to suspect the part numbers may get garbled, or if you're just paranoid, you can include a check digit.

It may be helpful for the humans to include dashes, dots, or spaces in the part number. A big reason why local phone numbers in the US are seven digits expressed as three digits, dash, four digits (555–1212) is that Bell System research showed that most people could remember at most seven digits, and they remembered the digits better if they were broken into a couple of groups. The computer can store the numbers without any of this stuff, but it should accept user input with or without the dashes, dots, etc.

When you're trying to decide how long to make the number, also consider how many numbers you will need total. Disk storage is cheap, and adding one more digit multiplies your total available part numbers by at least 10 or 26 or 36. If you later discover that the part numbers are too

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short and you need to go back and add more digits, this can range from trivial to painful (usually the latter) depending on the software. It may be smart to "waste space" now to save pain later.

If I were trying to do this from scratch for electronic components, I might do something like this:

[A-Z]-[0-9][0-9]-[0-9][0-9][0-9][0-9]

The initial letter would identify, broadly, the component type: (R)esistor, (C)apacitor, magic (S)moke, etc.

The next two digits would indicate more attributes of the component. For resistors, this might include metal film, carbon film, wirewound, through-hole, SMT, wattage, etc. Maybe this would be just one digit.

The final four digits would just get assigned as needed.

I would create a database to go with this, with the part number as the primary key of the main table. The main table would also have additional columns of descriptions that apply to most parts, like tolerance, through-hole or SMT, and so on. It would also have a reasonably-sized string field for future use. It's not "clean" design to have to stick two or three new attributes into this string field later, but sometimes it beats having to add a column to the table. There might be other tables for less frequently used descriptions, also indexed by the part number.

To make the production people happy, one of the pieces of data would be the part marking for parts that are color coded or too small for a complete part number. In other words, the list going to production would say things like "R-42-5309, resistor 1K 5% 0.25 watt metal film, brown-black-red" or "T-12-8670, transistor 2N2222A surface-mount, 8T5".

A place I worked at also used the Parts and Vendors software that has been mentioned. I don't know anything about it other than that it exists and it was possible to run it on several networked computers accessing a common database.

Whatever database or other software you use, and whatever backup plan you have, I would also suggest occasionally dumping the part number database tables to CSV or similar delimited plain-text files. If you need to change software vendors for whatever reason, most databases can be persuaded to accept a CSV or delimited-text input. To get your data into the new database, you might have to change single quotes to double quotes or escape the commas or whatever, but this is really easy to do with the right tools, such as awk, sed, perl, and friends on a Unix system.

I hope this helps!

Matt Roberds

- **References:**

- ◆ **Parts Numbering Scheme**
 - ◇ *From:* Roger Lascelles

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