

❖ PARTS KIT VERIFICATION SYSTEM

Several manufacturers supply parts kits with products that are to be assembled by the customer. When a kit is made-up of several miscellaneous parts, it is a challenge to insure that all parts are actually in each package. For inexpensive parts, some manufacturer will put extra parts in the package. Another possibility is to use a simple checkweigher or over/under scale. If the weight of the package is under the target weight, the package is set aside and someone has to open it and figure-out what is missing. This is a costly operation.

Reference	<b>150252</b>
SIC Code	<b>3743</b>
Platform	<b>PC820</b>

LIST OF ALL COMPONENTS	
Date Nov 19, 2002	
PART No.	Weight
1- B220-214 SCREW P	0.04140 lb
2- B502-872 REINFOR	0.05060 lb
3- B502-873 SCREW R	0.04100 lb
4- B200-110 FACEPLA	0.02680 lb
5- B300-013 BUSHING	0.00280 lb
6- B202-578 W-SCREW	0.01470 lb
7- B610-001 BATTERY	0.10310 lb
8- 48-043 USER KEY	0.05990 lb
9- P513-326 TEMPLAT	0.02230 lb
10- P513-873 INSTR.	0.02310 lb
11- P520-467 FIRE C	0.01100 lb
12- A501-878 FACE P	0.01150 lb
13- B520-471 FACE P	0.01200 lb
14- B520-283 BOX STK	0.00710 lb
15- 502-218 STRIKE D	0.04230 lb
16- B520-284 STRIKE	0.00000 lb
17- LATCH	0.27080 lb
18- OUTSIDE TRIM	0.78400 lb
19- INSIDE TRIM	0.70180 lb
20- TRAY	0.07140 lb
21- BOX	0.13310 lb

Another solution to this problem is using a PC-820 counting scale, with a twist. The PC-820 has been used for it's high accuracy. This accuracy is needed when small parts are involved.

The counting scale has an average piece weight database. The weight of each part that will be used in kits, has to be recorded in the database. Another table in the database holds, for each kit, a list of all parts to be included in that kit, including packaging and instruction sheets.

To verify packages, the operator enters the code for the kit on the scales' keypad. The scale can determine, from the list of parts, the target weight for this kit and tolerances. As parts kits are weighed, if the scale determines that the weight of a kit is not within tolerances, it will not only alarm the operator, but it will also attempt to determine the missing part from piece weights in the database. This eliminates some of the guessing work.

A system like this can be useful in any industry that packages products that include kits. The obvious one, is furniture of any kind: desks, chairs, bookshelves, cabinets, tables and manufacturers of related hardware such as screws, hinges, knobs and locks manufacturers

The list of potential industries is very large, it includes auto parts manufacturers, electronic goods manufacturers and sport equipment manufacturers just to name a few.

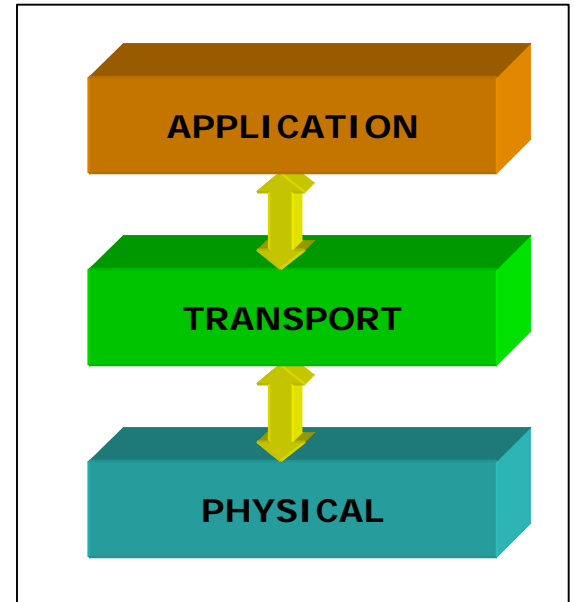
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## ❖ COMMUNICATION AND NETWORKING

The purpose of connecting two or more devices is to exchange information between those devices. The official Open Systems Interconnection (OSI) networking model has seven layers. We can look at a simplified model with only 3 layers:

Physical layer has to do with the hardware. For devices to communicate, they need to use the same hardware. The physical layer encompasses electrical characteristics, topology, connections and timing. An analogy can be if two people want to have a conversation, if one is on the phone and the other one is using a walky-talky, they will not be able to communicate. Both need to use the same 'hardware'. Words like RS-232, RS-485, Bluetooth and Ethernet belong in this layer.

The transport layer defines the way data is sent from one device to the other, how the message is formatted. If you heard words like protocol, packets and addressing, these all belong in the transport layer. Back to the telephone analogy, if both interlocutors are using a phone to communicate, if one speaks English and the other one speaks Chinese, even if they are both using the same hardware, they will not be able to exchange information. Protocols such as Zmodem, TCP/IP, or PPP are in this layer.



The application layer is about the content of the message. It determines how data is interpreted. Revisiting our telephone conversation example, even if both interlocutors speak the same language when one of them says a number, this number could be interpreted by the other interlocutor as a time, a price or a quantity, depending on the context of the conversation.

The goal of this discussion is not to turn you into a communications expert. It is only to illustrate that for devices to exchange data, there is more to it than just matching or specifying the hardware.

## ❖ PC-820 HIDDEN KEY

The PC-820 has a key that is not labeled or identified. However, this key is active and the scale can be programmed to detect and perform specific actions when the hidden key is pressed.

