



DEX Cash Audit Implementation Considerations

Listed below are operational areas that affect the implementation of a DEX-based cash accountability system, along with different methods of operation that could be used. This document discusses the pros and cons of the various methods and offers recommendations on which options will provide accurate accountability without diminishing the efficiency of route service personnel.

DEX data introduces the opportunity for operators to finally know exactly what cash and currency have been accepted by each machine. However, the accountability process becomes complicated by three important aspects of servicing a machine – change tube replenishment, payment of refunds to customers, and tests performed by repair technicians and route personnel. Following are procedural areas that need to be standardized along with some common, optional methods of operation.

- 1. Change Tube Replenishment**
 - a. Fill to par at every collect.
 - b. Fill to par or don't fill at all.
 - c. Occasionally fill to par, otherwise fill complete rolls of coin only (recommended).

- 2. Change Fund Procedures**
 - a. Use coin from a change fund to replenish tubes - leave machine cash untouched.
 - b. "Buy" coin from a change fund using currency and coin from machine sales (recommended).

- 3. Cash Reconciliation (Over/Short calculation)**
 - a. Include DEX-reported "Net Coin To Tubes"
 - b. Include driver-recorded "Coin To Tubes" (recommended).
 - c. Ignore all coins-to-tubes data when calculating over/short.
 - d. Include Refunds (recommended).
 - e. Include Tests (recommended).

- 4. Tests – Procedures and Data Entry**
 - a. Mechanic manually records value of tests. Brings document back to office for entry as separate transaction creating an overage that will be offset by the subsequent shortage generated at the next Collection/DEX read.
 - b. Mechanic manually records value of tests. Leaves document at machine for route driver to enter into handheld as part of next service.

- 5. Change Tube Reconciliation - Method and Frequency**
 - a. At every service using DEX data (requires filling tubes to par).
 - b. Over time, using the cumulative variance between driver-recorded cash-to-tubes and DEX-reported net-to-tubes, periodically refilling change tubes to par (recommended).

- 6. Change Fund Reconciliation – Method and Frequency**
 - a. Balance against DEX coin-to-tubes values.
 - b. Balance against driver-recorded coin-to-tubes values.
 - c. Require fixed amount at all times – reconcile each time new rolls are "purchased" from money room (recommended).



Change Tube Replenishment and Change Fund Procedures

The first issues to resolve are how to replenish change tubes and where the coin required to do that should come from. Let's look at the latter question first. Taking cash from the machine's currency stacker to "buy" rolls of coin from a change fund prevents the over-stating of sales, and makes change fund reconciliation simple. The total value of the change fund is always the same and there is no loose coin for the driver to deal with. For those reasons, it is the recommended process for refilling change tubes.

An alternative method would be to leave all coin and currency in the machine and replenish change tubes directly from the driver change fund. The DEX data stream tells us exactly how much cash/currency should be in the machine, so the over/short calculation would be simple and accurate. However the problem with this is that most vendors report sales as cash collected from the machine. If money is not removed from the machine in an amount equal to the value that is replenished to the change tubes, sales will continually be overstated. As a result, location commissions, driver commissions, and sales tax would also be overpaid. Therefore, to replenish change tubes we recommend buying coin from a change fund using money from machine sales.

Next, the question of whether or not to "par" the change tubes. Since the DEX data stream provides us with the data to calculate exactly how much coin is required to refill the change tubes, we could simply require drivers to refill to par at each service. This would result in an expected cash calculation as follows:

$$\text{(DEX Cash + DEX Bills + DEX Net Coin To Tubes) = Expected Cash}$$

It's a simple calculation, it doesn't require the driver to record any additional data, and presuming the driver refills the tubes to par religiously, you would get an exact over/short calculation at each collect. However, for reasons of efficiency and simplicity, change tubes are typically not refilled to par. In fact, most vendors have route personnel fill only complete rolls of coin to the change tubes, allowing for the simple exchange of currency for rolls of change. This is clearly the simplest and most practical method from a labor efficiency standpoint, and is therefore the preferred method. Unfortunately this complicates the calculation of over/short. It requires the driver to manually record the amount of change he replenishes to change tubes. Expected cash can then be calculated as follows:

$$\text{(DEX Cash + DEX Bills – Driver Coin To Tubes) = Expected Cash}$$

Even though it requires some additional work on the part of the driver to record coin-to-tubes, this is the preferred method of coin tube replenishment. It streamlines the process and still maintains an accurate over/short calculation.



Refunds and Tests

The two other variables that affect the over/short calculation are refunds and tests. Refunds are typically given out in cash. The question is where should the cash come from – machine sales, driver’s change fund, or somewhere else. If refunds are given from the driver change fund, it requires that rolls of coin be broken in order to provide odd change amounts. It can also potentially void the integrity of change fund currency reconciliation if drivers are allowed to use currency from the fund to pay refunds. Furthermore, it complicates the change fund reconciliation process because instead of counting only currency and rolled coin, the money room must now deal with loose change and match up fund deficits with refund request slips. For all of those reasons, we recommend that refunds be paid out of cash from machine sales, not from driver change funds. Amounts should be recorded by drivers and included as part of the expected cash calculation as follows:

$$\text{(DEX Cash + DEX Bills – Driver Coin To Tubes - Refunds) = Expected Cash}$$

The final variable is tests. These typically occur when service technicians have repaired a machine in the field and need to perform test vends to verify proper machine operation. If the coins used to perform the test come from the cash box (as they usually do), then there will be a shortage when cash collected is compared to DEX Cash. To adjust the over/short calculation accordingly, service technicians must record the value of test vends performed, and either leave the information at the machine so the route driver can enter it into his handheld, or return the information to the office for manual entry into the host system. A manual entry will cause an overage that will subsequently be offset by the shortage that occurs at the next collection and DEX read. If the route driver enters the data into his handheld, it will become part of the next collect transaction and the overage/shortage will net itself out. The expected cash calculation would now also include tests as shown below:

$$\text{(DEX Cash + DEX Bills – Driver Coin To Tubes – Refunds - Tests) = Expected Cash}$$

We do not have a preference for one method over the other. Regardless of which method is used, there should always be documentation for both refunds and tests that can be verified on a daily basis. If coin to tubes, refunds, and tests are recorded accurately and honestly, collections can be monitored with down-to-the-penny precision.

Change Fund and Change Tube Reconciliation

Now that we’ve addressed collections, refunds, and tests, the question becomes how to identify the dishonest driver who steals from the change fund or the coin tubes. For example, say he reports \$10 to tubes but only places \$5 to the tubes and steals a 5\$ bill from the fund. His change fund will balance overall, but the currency will be short when compared to total reported



coin-to-tubes. If he steals coin, it's a little harder to track down. Say the driver records \$10 to tubes, takes \$10 from the currency stacker, then puts \$5 into change tubes and \$5 coin in his pocket. The machine over/short will be zero and the change fund will balance. The only way to catch this thief is to periodically refill change tubes to par and/or to monitor the cumulative variance between DEX Net To Tubes and Driver-reported Coin To Tubes. The sum of all variances between DEX-reported Coin To Tubes and driver-reported Coin To Tubes represents the current state of the change tubes as shown below.

Machine Service	DEX To Tubes	Driver To Tubes	Variance	Cumulative Variance	Tube Status
First Service	(\$5.75)	None	\$5.75	\$5.75	(\$5.75)
2 nd Service	(\$6.50)	(\$10.00)	(\$3.50)	\$2.25	(\$2.25)
3 rd Service	(\$4.75)	None	\$4.75	\$7.00	(\$7.00)
4 th Service	<u>(\$7.25)</u>	<u>(\$10.00)</u>	<u>(\$2.75)</u>	\$4.25	(\$4.25)
	(\$24.25)	(\$20.00)	\$4.25		

In this example, the change tubes were down after each service. The driver only filled coin to the tubes twice, and he never filled the tubes all the way up. Comparing the DEX data to what the driver actually filled to the change tubes tells us that after the fourth service, the machine change tubes are still down by \$4.25. The only way to check that for sure would be to inspect the machine immediately after the driver services it. A more practical alternative is to have the driver periodically fill the tubes to par (using coin from the cash box to supplement amounts less than a full roll). Then we can get an exact change tube settlement as follows:

Machine Service	DEX To Tubes	Driver To Tubes	Variance	Cumulative Variance	Tube Status
5 th Service (to par)	<u>(\$6.25)</u>	<u>(\$10.50)</u>	<u>(\$4.25)</u>	\$0.00	Full
	(\$30.50)	\$30.50	\$0.00		

Filling the coin tubes to par brings the cumulative variance to zero. If all over/shorts since the last time tubes were filled to par also total to zero, you will have verified the absence of any cash shrinkage. If the driver has stolen coin from the change tubes as discussed earlier, it will show up as a shortage as illustrated below. Going back to our example, the driver records \$10 to tubes at the 2nd service, but only places \$5 to the change tube and steals the other \$5 in coin. The shortage shows up at the 4th service when the tubes are filled to par.

Machine Service	DEX To Tubes	Driver To Tubes	Variance	Cumulative Variance	Tube Status
First Service	(\$5.75)	None	\$5.75	\$5.75	(\$5.75)
2 nd Service (stole \$5)	(\$6.50)	(\$10.00)	(\$3.50)	\$2.25	(\$2.25)
3 rd Service	(\$4.75)	None	\$4.75	\$7.00	(\$7.00)
4 th Service (to par)	<u>(\$7.25)</u>	<u>(\$19.25)</u>	<u>(\$12.00)</u>	(\$5.00)	Full
	(\$24.25)	(\$29.25)	(\$5.00)		



The cumulative variance since the last time change tubes were filled to par should reset to zero when change tubes are again refilled to par. How often that is done is up to the operator. In situations where a specific driver is under suspicion, he could be instructed, on short notice, to fill all change tubes to par for a particular day or time period, allowing a complete settlement of his route cash situation.

Following the procedures outlined above, machine change tubes can be reconciled with the same precision and accuracy as machine collections.

Change Fund Reconciliation

The third component of cash audit is reconciliation of the driver change fund. As discussed earlier, we recommend that coin for change tube replenishment be purchased using currency and cash from machine sales. That way, the total value of currency and coin in the fund never changes. Also, the currency in a driver's change fund will represent the total of coins filled to change tubes. Currency can be counted and compared to the total coin-to-tubes recorded on the driver's handheld. If the currency counted doesn't match to the total coin-to-tubes, it has either been stolen, or the driver forgot to pull currency from a machine to buy coin for replenishing change tubes (in which case there should be an overage for that machine). Finally, in an effort to keep change fund reconciliation as simple as possible, we recommend that refunds and tests use coin from machine sales, not from the change fund.

That completes our discussion of the three components of a total cash auditing system – Machine Cash Reconciliation, Change Tube Reconciliation, and Change Fund Reconciliation. All three must be analyzed in context with one another to get a complete picture of cash activity on the route. As you can see, it is imperative that procedures be standardized prior to the implementation of a DEX-based cash auditing system. Following the recommendations identified in this document, operators can achieve the tightest and most complete cash control possible.