

**MCS PerfectMatch v6 Log Sample1.rtf**  
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### **MCS Perfect Match Integrity System**

Many industries including the banking, medical, pharmaceutical and the government have been demanding a higher level of integrity in the mailing industry. Two areas of concern are avoiding duplicate feeds into one envelope, and confirming and logging mail pieces as they come off an inserter.

MCS has modified the Perfect Match System to address the needs of these industries. Our system consist of a two cameras, a very high level of integrity regarding tracking, intelligent diverting and a very detailed logging system that explains were pieces end up.

The system starts with the common practice of sequentially numbering every piece of mail. We recommend putting the first camera after the feeder, instead of the end of the process. If the bindery mixes pieces up, you don't want to fix the problem when the pieces are already in the track. If just a couple of pieces are out of order, we divert the pieces. If a larger number of pieces are out of order, we stop the system (the number is user defined). This strategy also gives you the ability to track what happens to pieces in the process of inserting.

This simple system avoids duplicate feeds into one envelope. For example, if the camera reads piece 1,2,3,5, you would assume that either read 3 or 5 includes piece 4. You can have the system divert both 3 and 5, to check for double feeds.

A second camera is located at the end of the process to confirm successful travel of a piece through the process. This process can also be used to confirm that the address is visible through the window of an envelope (piece inserted incorrectly, no piece inserted).

We offer a number of user defined options to improve productivity, while increasing the integrity of the mailing.

### **MCS Flight Recorder**

The MCS Perfect Match System tracks the final destination of a mail piece as it travels through the inserting process into a log.

There are four possible outcomes for an expected mail piece on inserting equipment use the MCS Perfect Match.

- 1) Piece OK
- 2) Piece Fail
- 3) Piece Removed
- 4) No log entry

1) The camera reads the barcode or automation mark, it passes all requirements (ie. Sequential order, number of digits) and the piece makes it through the entire process successfully. We refer to this as "Piece OK".

2) The camera misreads, or the piece fails a condition (sequence order, number of digits, acceptable value), and the piece is diverted (or system stops). The system can support multiple divert stations with assigned conditions. This is refer to as "Piece Fail"

3) The system has a condition (jams, pieces fall off conveyor, machine stops, and operator takes piece off machine), and the pieces are taken out of the process. This is referred to as "Piece Removed"

4) Pieces are expected, but never make it to the inserter. Pieces get destroyed in the laser and

bindery production and never make it to the inserter. The MCS Perfect Match can create an exception report log which compares a database, to the actual pieces that went through the system. To use this report, you must load the database file before the job.

### **System Description:**

The Perfect Match System breaks down mail inserting systems into logical slots, which never have more than one mail piece in them while a machine is operating. Devices such as cameras, diverters and inkjets can be defined inside of slots through the Perfect Match configuration file.

A typical system will have between 20 and 45 slots defined. These slots allow the MCS Perfect Match System to track pieces on almost any type of mailing equipment with a very high level of integrity. This type of tracking used is similar to tracking systems on million dollar transactional inserters.

### **Sequence of the log entrees**

The log represents the destination of mail pieces through the machine, so entrees into the log will not be sequential. For example, if the sequential checking is turned on, and the camera reads, "1,2,8,3,4,9,5", records 8 and 9 might make it to the diverter, before records 2,3,4,5 make it to the end of the system, because the diverter is after the turnover station (which my be 12 feet before the end of the system).

The demo log was generated automatically by the PerfectMatch software. Its native format is tab-delimited. This log is a flight recorder log, which records the destination of a mail piece as it was tracked by the Perfect Match System. Reports can be generated easily using the data in Excel, Access Crystal reports or any database program.

The "Piece OK Log" can be used as a log for 100% mailing, if all you need to know is what pieces made it through the process successfully. This log gives details to what happen to pieces in the process.

### **Example Sample Log**

The sample log was produced on a 20-Slot FlowMaster with a camera in slot 4, followed by a diverter (Diverter1) then an MCS printer base with a printer and 2nd camera (which verifies the IMB barcode printed on the envelope matches the 2-D barcode on the insert), then another Diverter (Diverter2):

Slots 1->20: FlowMaster cycling slots  
Slot 4: Camera 1 location reads the insert  
Slot 19: Piece leaves FlowMaster turnover table  
Slot 20: Diverter 1 located  
Slot 23: Printer location  
Slot 24: Camera 2 location  
Slot 25: Diverter 2 location

### **LOG ENTRIES EXAMPLE DESCRIPTIONS:**

The sample file has line numbers entered as a reference. They are not included in the log.

Lines 1-21: Machine startup. Empty pockets are cycling until the feeders start feeding. The sensor at the end of the turnover is seeing nothing come out each cycle.

Line 22: The piece with barcode 10000 reached slot 25 with no errors and was logged as being successfully processed. This means camera1 read the barcode to be "10000", and camera2 eventually read the IMB barcode and it matched "10000". The piece was verified crossing the sensor in slot 25 when it should have.

Line 46: Camera 1 was unable to decode the barcode on this piece when it was in slot 4 so it was tagged as "Misread" and continued on until it reached Diverter1 in slot 20 which is now going to divert it. The (F-) means that of the 2 enabled cameras present, camera 1 failed (F) and camera 2 hasn't seen/read the piece yet (-). Remember camera2 is in slot 24 and the piece hasn't gotten there yet.

Line 49: Slot 21 detected that the diverted piece was in fact removed. This may seem redundant given line 46, but it's important because it verifies that the diverter did in fact divert the piece.

Line 51: The inserter stopped, not from us, and we don't know why. The operator could have stopped it or it could have miss-fed etc. Notice that the output transport (our printer table) keeps running and the piece on it exited successfully while the inserter was stopped (piece 9972). The inserter started up again 17 seconds after it stopped (see the time stamp on line 53). Note we can configure the system so the PerfectMatch E-Stops multiple systems as well.

Line 55: Diverter 2 in slot 25 is going to divert piece 9970 because camera 2 read the piece as 9962 (mismatch). The (PP) means that both camera1 and camera2 read the piece and successfully decoded the barcode (Passed) but the decoded barcodes (2-D on camera1 and IMB on camera2 didn't match) which theoretically means the wrong piece is in the envelope (I manually forced the mismatch here). Line 56 verifies that the piece was in fact diverted. Note that the software can be set to immediately E-Stop the inserter on mismatches.

Line 80: Camera1 decoded the barcode to a value that does not exist in the associated data-base and our software was set to E-Stop on the "Invalid Key" condition. Line 81 is our E-Stop, and line 83 is our controller detecting that the Inserter did indeed stop. Notice that while the Inserter is stopped the operator manually fixed/edited the piece by double-clicking on it and typing in the correct value (line 85). 14 seconds later the Inserter was started up again and resumed (line 86)

Line 98: Diverter 2 is going to divert piece 9935 because camera2 was unable to decode the barcode (PF). Line 99 confirms it was diverted. The piece was able to be identified as piece 9935 because camera1 read it, but it is being diverted as a misread because camera2 could not decode the IMB. The (PF) means camera1 passed, camera2 failed.

Line 120: The software was set to verify the pieces entering the system are in sequential decreasing order. Further options are allowing multi-feeds in one envelope to be diverted. Line 120 however reports piece 9858 was encountered when only pieces 9896, 9897 or 9898 were viable. Therefore we E-Stopped the Inserter and it actually stopped (Line 122). The Inserter was started up again 15 seconds later with no corrections.

Line 127: The Inserter stopped - not by us...

Line 140: The non-sequential piece detected by camera1 in slot 4 reached Diverter1 in slot 20 and will be diverted.

Line 145: See line 46...

Line 173: See line 55...

Line 237: The PerfectMatch detected a jam in slot 22 and stopped the Inserter. The operator physically removed the pieces then highlighted them on our run screen and clicked "Clear Selected" to remove them from the run screen - which he should do because he physically removed them from the system. Notice that even though the event is "Piece Removed", the description starts with "Piece Deleted" to denote that the operator removed/deleted them manually.

Line 242: Things get a little confusing here. What happened was that immediately after the Inserter started up again it jammed again and we stopped it again. The operator then cleared the pieces from the software but it appears a piece was mistakenly left on the belt. This is so because line 245 reports that something triggered slot 25's sensor even though there wasn't supposed to be a piece there! We define that event as a "Phantom" piece - because the sensor should not have been triggered. Note that the same scenario occurs if someone simply waves their finger under a slot sensor when no piece is present. It's an unexpected sensor trigger and the software simply ignores it (unless "Detect Phantom Pieces" is enabled).

Lines 275-281: Similar scenario to Line 242. This time the operator cleared the pieces from the software but left them on the belt - which caused the events on lines 278,279. Then another jam occurred (that stuff happens in real life).

Line 351: Similar to line 80 but the operator did not correct the value. This caused the software to resync its sequential sequence so it expected the next piece to be -1! (zero minus 1 equals negative 1). It then resync'd again on the value 9625. Notice that 9625 does not appear to be correct because the line above says 9643 and the line below is 9642. **This is because the "Piece OK" entries are reporting the pieces that are falling off the end of the system (after slot 25) while the sequence check is being performed by camera1 in slot 4. That's just the way flight-recorder logs work. When camera1 detects a problem there are 21 pieces between camera1 and the end of this system! This mindset is necessary and must be used to properly decipher the events in these logs.** Lines 373, 374 report when these pieces reached Diverter1 and were in fact diverted...

Line 394-397: The user stopped the Inserter so he could manually correct a misread piece. Line 396 shows that the operator double-clicked on a piece that was misread by camera1 and entered the correct value (9562) then restarted the Inserter (Line 397). This is perfectly valid operation and this piece will now be treated as if camera1 read it correctly. Note that some customers may wish to set the PerfectMatch software so it stops the Inserter automatically on every misread so the user can manually enter the correct value for every misread piece and prevent those pieces from being diverted etc.

Lines 410-416: Similar to line 80: shows an invalid barcode being manually corrected.

Lines 462-471: Shows a jam in slot 24 being cleared and in the process sensors on slots 24 and 25 were tripped multiple times (possibly by pieces being removed or the operator's hands etc) then the machine was started up again.

Line 519: "Clear Deck" was pressed on the Flowmaster which causes it to cycle out all the pieces in the system without feeding any new ones. Camera1 can't tell the difference between empty slots and slots with pieces whose barcodes can't be decoded. The PerfectMatch detects them missing when they reach our first sensor in slot 20. At that point it appears as if a misread piece was removed.

Line 535: The Inserter finished clearing its pieces and stopped.

Lines 536-556: The PerfectMatch program performed a "Clear All" in preparation for terminating which purges all pieces (including phantom pieces) from the system. Notice the word "Clear" in the descriptions. In the event the operator was to close the PerfectMatch with good pieces in the system then this operation would correctly log all those pieces as removed.

