6 • OMR

6.1   A BRIEF OVERVIEW OF OMR ON THIS SYSTEM

OMR sensors are fitted to the sheet feeders and are mounted within the machine case. They are easily adjustable for the following paper sizes:
- 8 inch wide
- A4
- American Letter (8-1/2 inch wide)
- Intermediate sizes (between 203mm to 215mm wide)

One sheet feeder holds sheets* with OMR marks:
- Sheet Feeder 1 (Top or only Sheet Feeder) for C-fold and double-fold
- Sheet Feeder 2 (Bottom Sheet feeder) for Z-fold and Single-fold

*The sheet feeder holding the sheets with OMR marks can feed multiple sheets per envelope.

The sheet feeder not holding OMR sheets can hold supplementary sheets that you can place under the selective control of the OMR sheets. You can also set up the insert feeder to be under the selective control of the OMR sheets. As a result, OMR can be used to fill an envelope with a variable number of sheets from one feeder, with or without a supplementary sheet and an insert.

A supplementary sheet and folded insert will be nested with the first sheet in the envelope. As OMR allows each envelope to contain tailored contents, the last sheet in the envelope will include address information for use with windowed envelopes to ensure that each set of sheets is addressed to the correct recipient.

OMR uses extensive error checking to provide an extremely low possibility of the wrong set of sheets being inserted into an envelope.

The maximum overcount figure is NOT configurable. It is set in the software for a maximum of five sheets for C, Double and Z folds, and 10 for Single fold.

6.2   OMR SPECIFICATIONS

The mark must be a solid black line between 1pt and 2pts thick (0.35mm to 0.7mm) and at least 10mm wide. The marks should be printed on white paper.

The paper weight should be between 70-90gsm.

The maximum total compressed thickness of the outer envelope should not exceed 2mmm.

The paper width should be 203mm to 215mm (8 to 81/2 in). This includes A4 and American Letter sizes.

Each mark position must be evenly spaced and at least 3mm apart.

An area around the marks should be kept clear from print, etc. that may be read by the scanner in error, this area is called the Clear Zone.

There should be no print on the opposing face of the sheet immediately behind the Clear Zone.
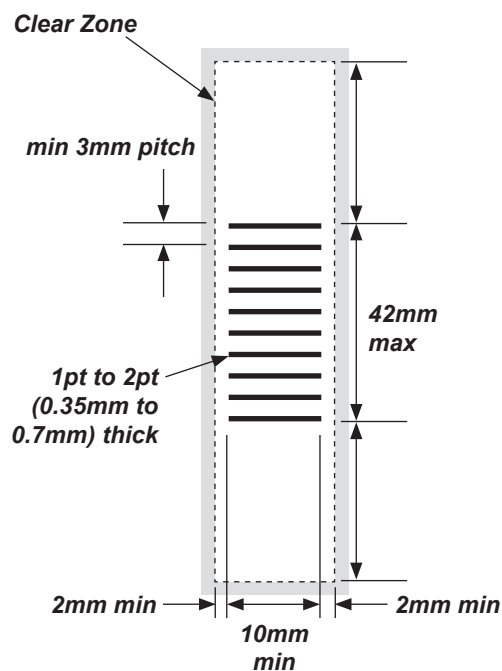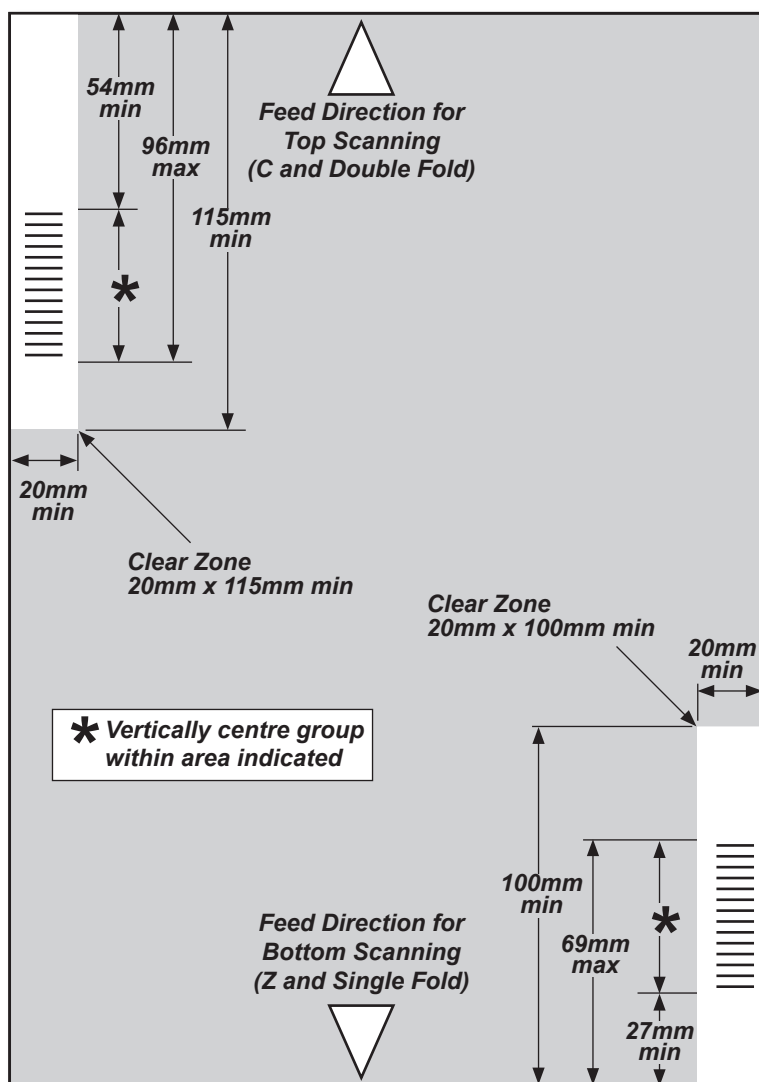
Clear Zone

min 3mm pitch

42mm max

1pt to 2pt (0.35mm to 0.7mm) thick

2mm min

2mm min

10mm min

Diagram NOT to scale

'Standard' OMR Positions

Standard OMR Positions diagram showing feed directions and clear zones:

- **54mm min**
- **96mm max**
- **115mm min**
- **Feed Direction for Top Scanning (C and Double Fold)**
- **20mm min**
- **Clear Zone 20mm x 115mm min**
- **Clear Zone 20mm x 100mm min**
- **20mm min**
- ✱ **Vertically centre group within area indicated**
- **100mm min**
- **69mm max**
- **27mm min**
- **Feed Direction for Bottom Scanning (Z and Single Fold)**
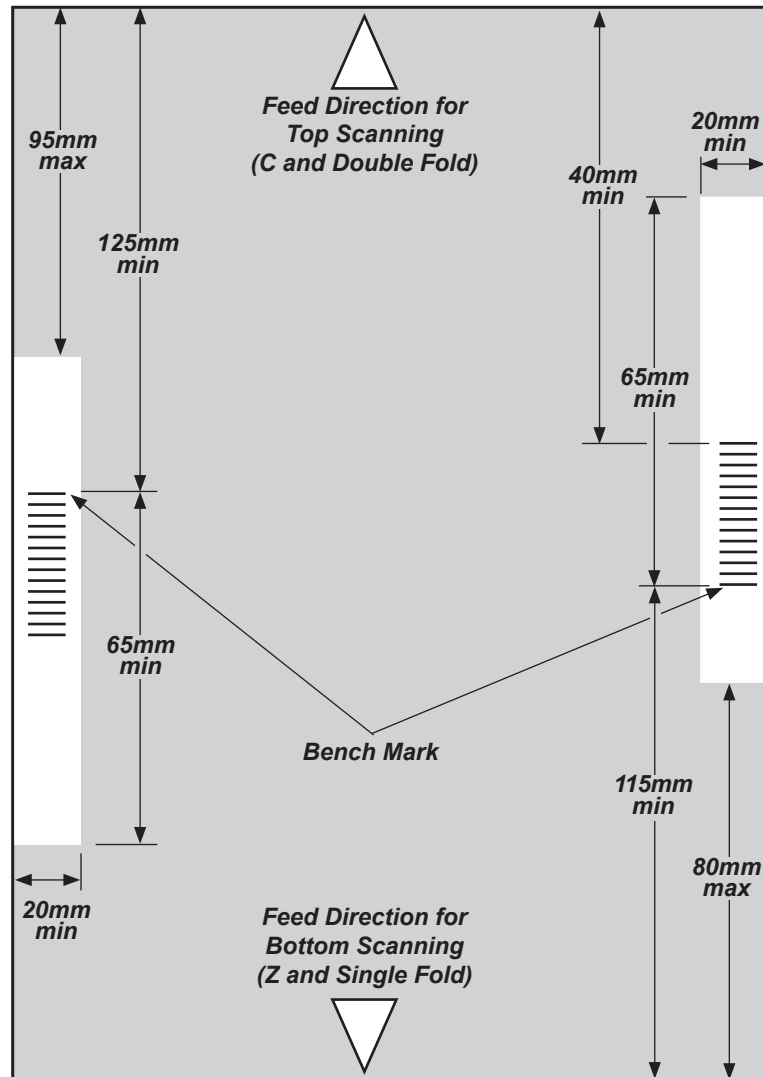
OMR marks should be positioned as follows:

'C' Fold and Double Fold: TOP SCANNING, TOP LEFT CORNER
'Z' Fold and Single Fold: BOTTOM SCANNING, BOTTOM RIGHT CORNER

Diagram NOT to scale

'Offset' OMR Positions

Feed Direction for
Top Scanning
(C and Double Fold)

95mm
max

20mm
min

125mm
min

40mm
min

65mm
min

65mm
min

Bench Mark

115mm
min

80mm
max

20mm
min

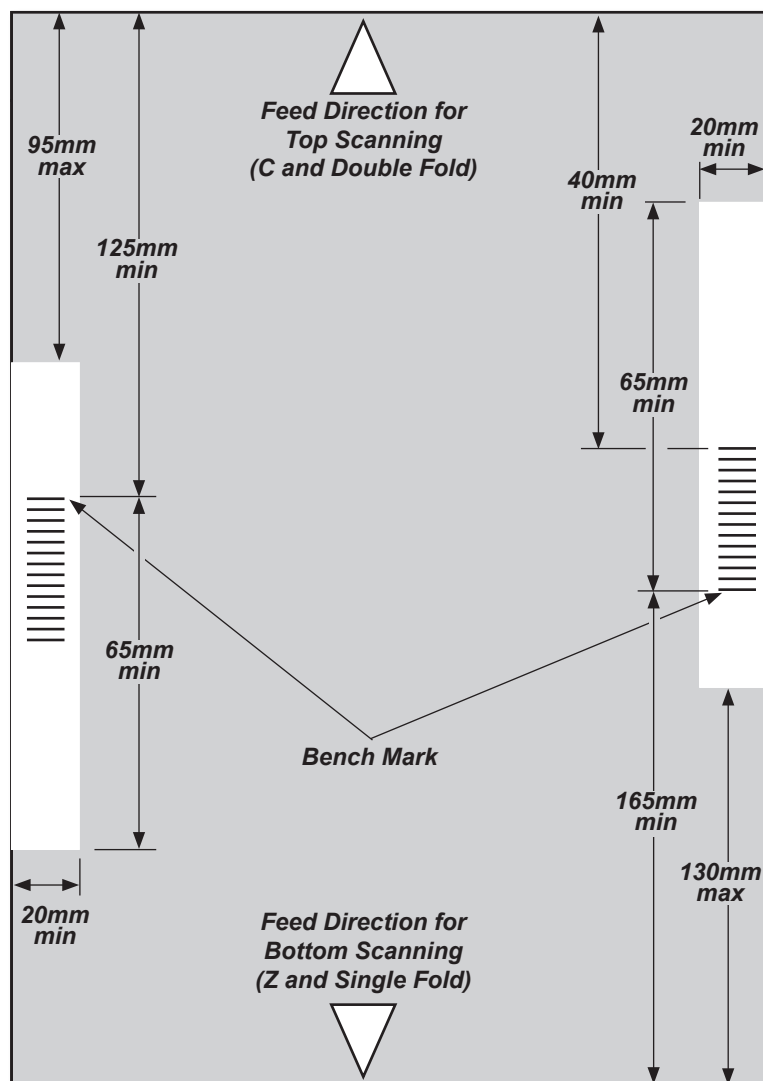Feed Direction for
Bottom Scanning
(Z and Single Fold)

OMR marks should be positioned as follows:

'C' Fold and Double Fold: TOP SCANNING, LEFT MARGIN
'Z' Fold and Single Fold: BOTTOM SCANNING, RIGHT MARGIN

Diagram NOT to scale

'Swiss Offset' OMR Positions

95mm max

Feed Direction for Top Scanning (C and Double Fold)

20mm min

40mm min

125mm min

65mm min

65mm min

Bench Mark

165mm min

130mm max

20mm min

Feed Direction for Bottom Scanning (Z and Single Fold)

OMR marks should be positioned as follows:

'C' Fold and Double Fold: TOP SCANNING, LEFT MARGIN
'Z' Fold and Single Fold: BOTTOM SCANNING, RIGHT MARGIN

Diagram NOT to scale

To change from 'Normal Offset' to 'Swiss Offset' simply enter service parameters and scroll through until OMR Offset Feeder 2 is displayed. This value should be 115 for 'Normal Offset' and 165 for 'Swiss Offset'. Any other values entered here are not supported and may cause scanning issues.

NOTE:

Select Feed cannot be used when using 'Offset' or 'Swiss Offset', this is due to the late scanning of the code making it too late to collate the supplementary sheet or nest the insert with in the sheet. Group 2 OMR still can be used for AutoBatch.

The minimum, paper weight when using 'Offset' or 'Swiss Offset' is 80gsm.

6.3   OMR MARK GROUPING

Each OMR code begins with two fixed marks at the end nearest to the sensor (Benchmark and Safety mark). These are followed by one, two, or three groups of marks where each group comprises three data marks followed by a fixed mark. Each data mark is present or absent as required to reflect the desired function. Each code must end with a Retiming Mark.
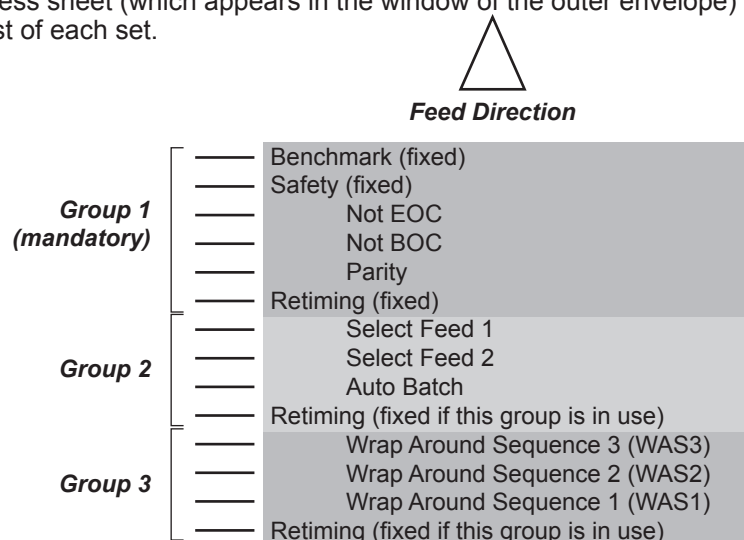
Basic OMR mode uses only Group 1.

Enhanced OMR mode uses Group 1 plus Group 2 and/or Group 3, as needed for a particular job.

6.3.1   'C' Fold and Double Fold jobs

Marks must be placed in the upper left corner of the sheet. The marks must be printed in the top-to-bottom order: (The Benchmark being the mark closest to the top of the sheet).

Sheets must be printed in reverse collation order. Therefore, the last sheet processed in each set is the address sheet (which appears in the window of the outer envelope) and the first sheet processed is the last of each set.

Feed Direction

Group 1 (mandatory)
- Benchmark (fixed)
- Safety (fixed)
- Not EOC
- Not BOC
- Parity
- Retiming (fixed)

Group 2
- Select Feed 1
- Select Feed 2
- Auto Batch
- Retiming (fixed if this group is in use)

Group 3
- Wrap Around Sequence 3 (WAS3)
- Wrap Around Sequence 2 (WAS2)
- Wrap Around Sequence 1 (WAS1)
- Retiming (fixed if this group is in use)

6.3.2   'Z' Fold and Single Fold jobs

Marks must be placed in the lower right corner of the sheet. The marks must be printed in the bottom-to-top order, (The benchmark being the mark closest to the bottom of the sheet).

Group 3
- Retiming (fixed if this group is in use)
- Wrap Around Sequence 1 (WAS1)
- Wrap Around Sequence 2 (WAS2)
- Wrap Around Sequence 3 (WAS3)

Group 2
- Retiming (fixed if this group is in use)
- Auto Batch
- Select Feed 2
- Select Feed 1

Group 1 (mandatory)
- Retiming (fixed)
- Parity
- Not BOC
- Not EOC
- Safety (fixed)
- Benchmark (fixed)

Feed Direction
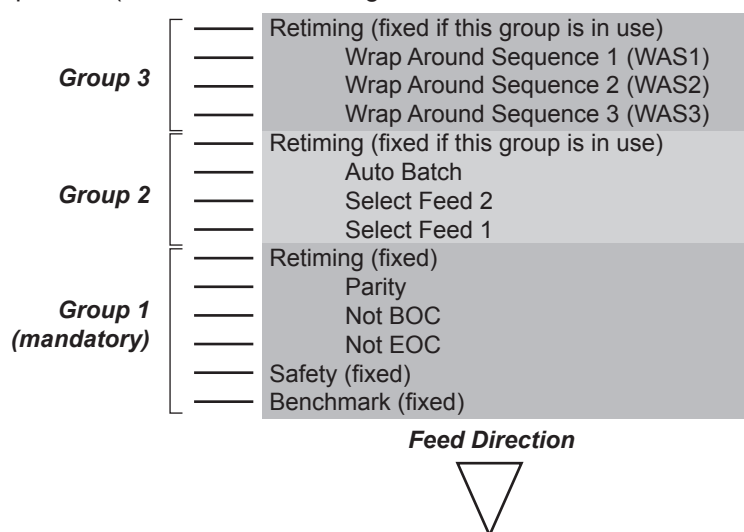
Sheets must be printed in normal collation order. Therefore, the first sheet processed in each set is the address sheet (which appears in the window of the outer envelope) and the last sheet processed is the last of each set.

6.4   BASIC OMR

Basic OMR enables you to collate multi-page documents that vary between one and five sheets (10 sheets with Single fold and certain paper weights). It allows you to vary the number of pages per envelope in a run from envelope to another through the use of OMR marks based on the document information in the customer's database. Basic OMR does not ensure mailpiece integrity since there is minimal error checking. It should not be used for sensitive documents such as invoices.

The machine will fold each OMR sheet separately and insert it into an envelope, starting with the last sheet of the set and adding each folded sheet in turn until the address sheet has been inserted. The machine will then eject the envelope after sealing (if selected).

When using Double, C or Z folds up to five sheets from one sheet feeder may be inserted into a single envelope with or without a supplementary sheet and/or an insert. When using Single fold up to 10 sheet can inserted into a single envelope (A supplementary sheet or insert counts as 1 of these sheets).

6.5   BENCHMARK

This is a mandatory mark within the code and it will be the first mark scanned by the machine, it will appear on every sheet within the set.

6.6   SAFETY

This mark improves the integrity of the mailing, and as it is the second mark scanned, the machine will calculate the distance between the marks. Once this is done, the machine will then be able to automatically work out the length of the code.

6.7   BOC-(NOT) AND EOC-(NOT)

Two mark positions are allocated to this function, one (NOT-BOC) to indicate that a sheet is not the beginning of a set and one (NOT-EOC) to indicate that a sheet is not the end of a set. For a single-sheet set, neither mark is printed; for intermediate sheets in a three or more sheet set, both marks are printed.
See Figure- Allowable Mark Combinations for Basic OMR Diagram (Pg 6-9)

For both C/double and Z/single fold jobs, the NOT-EOC mark is printed on every page but the first page of each collated set (the address-bearing page, whose address appears through the window of the envelope), which will always be the last page fed into the inserter. The NOT-BOC mark is printed on every page but the first page of each collated set, which will always be the first page fed into the inserter.

6.8   PARITY AND OTHER CHECKS

The OMR code includes a parity mark and other fixed marks. The parity mark is used for error checking and is printed such that the total number of marks printed—including the parity mark, benchmark, safety mark, and retiming mark(s)—**is even**.

If an error is detected, the machine will stop with an explanatory error message and await manual recovery. Most errors will stop before the erroneous sheet has been folded to allow the operator to evaluate the error and, where appropriate, to place the sheet back in the feeder and in proper order, before continuing the run. Where this is not possible, the Clear Deck button will eject the unsealed envelope and any sheets in transit. The machine will then allow the user the choice of manual review of remaining sheets or automatic folding and ejection of any remaining sheets of the current set.

6.9   RETIME MARKS

Retime Marks are necessary for reliable reading of the code, due to the paper speed varying as it feeds. With Basic OMR only the first Retiming mark is needed, if one or both of the other groups are used the Retime Mark associated with that group(s) must also be printed. Retime Marks must be print on every sheet with in the prime set.

NOTES: The beginning sheet of a set is defined as the first to be picked up and fed. This is always the last logical page of a document, whether reverse-collated in Sheet Feeder 1 or forward-collated but face down in Sheet Feeder 2. Similarly, the end sheet of a set is defined as the last to be picked up and will always be the address sheet.

After clearing the deck and before continuing the run, the user has only to complete the current set manually and to ensure that the top sheet in the OMR sheet feeder is the last one of the next set to be processed.

6.10   ALLOWABLE MARK COMBINATIONS

Collated Set—One Page Document

Page 1 of 1
- Benchmark (fixed)
- Safety (fixed)
- Not EOC
- Not BOC
- Parity
- Re-timing (fixed)

Collated Set—Multiple Page Document

First Page of Set
(Last Page Fed)
- Benchmark (fixed)
- Safety (fixed)
- Not EOC
- Not BOC
- Parity
- Re-timing (fixed)

Middle Page(s)
- Benchmark (fixed)
- Safety (fixed)
- Not EOC
- Not BOC
- Parity
- Re-timing (fixed)

Last Page of Set
(First Page Fed)
- Benchmark (fixed)
- Safety (fixed)
- Not EOC
- Not BOC
- Parity
- Re-timing (fixed)

Allowable mark combinations for Basic OMR

6.11   ENHANCED OMR

Enhanced OMR allows you to stop feeding sheets at selected points in a run and/or to select whether the other feeders are used—separately for each envelope. It also provides a higher level of mailpiece integrity so that sensitive documents are not sent to the wrong customer.

6.12   AUTO-BATCH

Enhanced OMR adds an Auto-Batch mode to supplement the normal OMR batch mode. This can be used to stop the OMR at predefined points in the run, for example, between addresses with different post codes, at tray breaks, or to identify pieces for special handling (such as a hand signature). An OMR mark, derived from the print database, specifies whether or not to stop the run after completion of the current set.
This mark if printed, must be present on all sheets within that set

For Auto-Batch mode, use Group 1 and Group 2 marks and optionally Group 3.

6.13   SELECTIVE INSERTION

Selective Insertion allows you to specify whether to include a supplementary sheet from the other sheet feeder using Select Feed Mark 1, or if the set is to include an item from the insert feeder (such as a card, business reply envelope, or folded insert), Select Feed Mark 2 must be printed.
If Select Feed 1 Mark is printed, the supplementary sheet will be folded with the first sheet of the prime set and if Select Feed Mark 2 is printed, a folded insert will be nested with it.
When using Select Feed, the mark(s) must be printed on all of prime sheets with in the relevant set.

Limits on paper dimensions and weights remain as currently specified for the OMR in Section 2, the Specifications section of this manual.

For Selective Insertion, use Group 1 and Group 2 marks and optionally Group 3.

6.14   WRAP-AROUND SEQUENCE

A series of three OMR marks can be used to implement a sequential count across a print run. These wrap-around sequence marks ensure a higher level of integrity by counting in a binary sequence, sheet by sheet, in order to detect missing or misplaced sheets. If the OMR detects a break in the se-quence (non-consecutive marks), it stops and displays an error message. For example, the inserter would stop if the printer had picked up two sheets when printing a page, or if the pages have been disturbed and are out of order, or if the OMR picks up two sheets while its double-detect feature is not in use. So that a run can be restarted at any suitable point, the OMR assumes that the first sheet it picks up on starting a run is correct and checks for sequential marks thereafter.

Wrap-around sequence counts from 0 to 7, then back to 0 again 7 (Incrementing in order), so every page is accounted for. See Table on the next page.

6.15   WRAP-AROUND SEQUENCE MARKS

Counting Sequence	OMR Mark	Page Number *Example: 5-page Document*
0	All three WAS marks are absent	Page 5
1	WAS1	Page 4
2	WAS2	Page 3
3	WAS1 + WAS2	Page 2
4	WAS3	Page 1
5	WAS3 + WAS1	Page 5
6	WAS3 + WAS2	Page 4
7	WAS1 + WAS2 + WAS3	Page 3
0	All three WAS marks are absent	Page 2
1	WAS1	Page 1
2	WAS2	And so on…

WAS1 is always the mark position closest to the final re-timing mark. The WAS marks count up as you go down the stack, therefore they count down as the document page numbers increase because the documents are reverse-stacked (for C-fold and double-fold) or forward-stacked but face down (for Z-fold and single-fold).

For Wrap-Around Sequence, use Group 1 and Group 3 marks and optionally Group 2.

If Group2 Marks are not used with in the code, Group 3 marks can be moved up next to group 1 marks.

6.15.1   Mark Code Interpretation

Marks for EOC and BOC are specified in negated form. Each OMR code must begin with a benchmark followed by a safety mark and must end with a re-timing mark. The benchmark and safety mark are used by the software to determine the mark spacing for the rest of the code. The re-timing marks are used to minimize the chance that a code is misread and also as part of an error correction algorithm. Additional re-timing marks separate the data marks into three groups of three as follows:

Basic OMR uses only Group 1. Enhanced OMR uses Group 1 plus Group 2 and/or Group 3.

Group 1 (mandatory)
——— Benchmark (fixed)
——— Safety (fixed)
——— Not EOC —this mark should be on all except the last sheet of a collation
——— Not BOC —this mark should be on all except the first sheet of a collation
——— Parity—set if necessary to give this code EVEN parity
——— Re-timing (fixed)

Group 2
——— Select Feed 1—on all sheets of a collation that includes a supplementary sheet
——— Select Feed 2—on all sheets of a collation that includes an insert
——— Auto-Batch—on all sheets of the last collation of a batch
——— Re-timing (fixed if this group is in use)

Group 3
——— Wrap-Around Sequence 3 (WAS3)
——— Wrap-Around Sequence 2 (WAS2)
——— Wrap-Around Sequence 1 (WAS1)
——— Re-timing (fixed if this group is in use)

Identifying the OMR marks for 3 Series

Basic OMR uses only group 1. Enhanced OMR uses group the Group 1 plus Group 2 and / or Group3. Always include the Group 1 in an OMR code. You may include either or both of the second and third groups if these features are needed for a particular job. If the Auto-Batch function is used, the mark must appear on each sheet of the last set of a batch printed in reverse-collation, and on the first set of a batch printed in forward-collation.

6.16   ENABLING THE OMR FEATURES
6.16.1   Basic OMR

To enable the Basic OMR option:
1. Open the hinged cover to the right of the OMR display.
2. Press the **Change** button (+/-) to enter Access Code 17.
3. Press the **Next** (▶) button until the option Set Parameters appears, then press the Start button.
4. Press the **Next** (▶) button until the option Select OMR Basic Mode appears, then press the Start button.
5. The display shows OMR Basic Mode Is OFF. Press the **Change** (+/-) button until the display shows OMR Basic Mode is ON. Press the **Stop** button. This enables Basic OMR.
6. Exit Set Parameters per your usual procedures.

6.16.2   Enhanced OMR

Enhanced OMR includes the Basic OMR features plus selective feed, auto-batch and wrap-around sequencing (WAS). These Enhanced features are not accessible and are not displayed in menus for OMR machines configured for Basic OMR.

If the customer has purchased the Enhanced OMR option, the Pitney Bowes Service Representative enables the full set of OMR features through the Service Setup menu by entering the passcode **350350** when prompted.

Do NOT give this passcode to the customer.

To enable the Enhanced OMR option:
1. Open the hinged cover to the right of the OMR display.
2. Press the **Change** button (+/-) to enter Access Code 17.
3. Press the **Next** (▶) button until the option Set Parameters appears, then press the **Start** button.
4. Press the **Next** (▶) button until the option Set Enhanced OMR Mode appears, then press the **Start** button.
5. The display indicates Count: 0. Press the **Change** button (+/-) until the count reads **350350**. This is the code that enables Enhanced OMR. Press the **Start** button. The display shows Enhanced OMR Mode Is ON.
6. Exit *Set Parameters* per your usual procedures.

6.16.3   Switching Off OMR

To switch off enhanced OMR:
1. Open the hinged cover to the right of the OMR display.
2. Press the **Change** button (+/-) to enter Access Code 17.
3. Press the **Next** (▶) button until the option Set Parameters appears, then press the **Start** button.
4. Press the **Next** (▶) button until the option Set Basic OMR Mode appears, then press the **Start** button.
5. The display shows OMR Basic Mode Is OFF. Press the **Change** (+/-) button until the display shows OMR Basic Mode is ON. Press the **Stop** button. This enables Basic OMR.
6. Exit Set Parameters per your usual procedures.
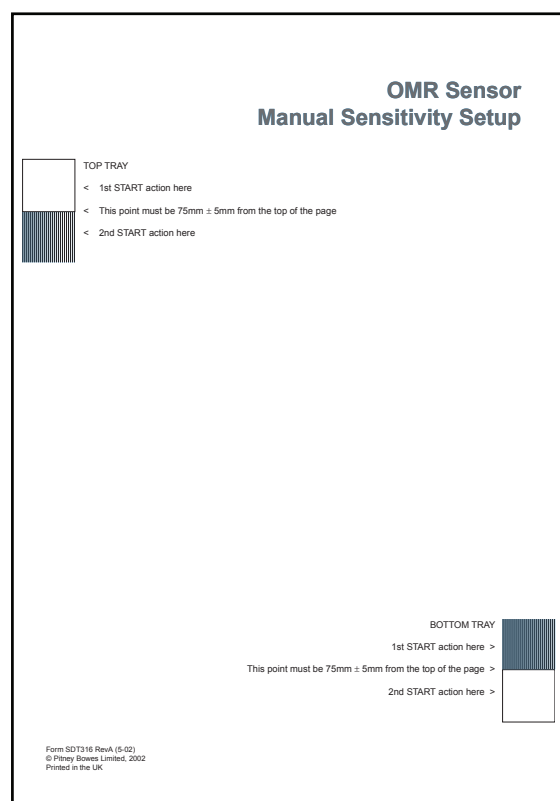7. Both Basic and Enhanced OMR will now be switched Off.

6.17 SCANNING TEMPLATE

A combined Scanning Template and OMR Sensor Set-Up document is available from IDC stock under form number SDT316. For your information, a reduced size reproduction is shown below:
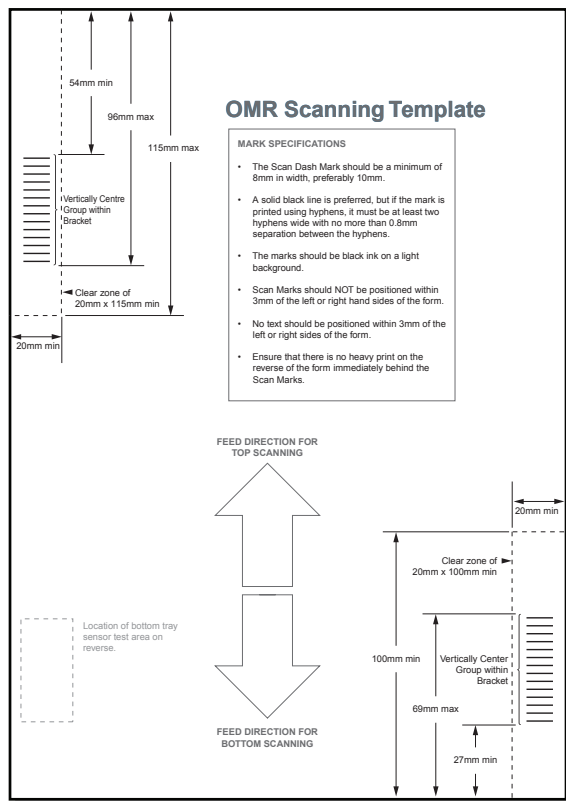
Front of SDT 316

Rear of SDT 316

Section 7.4.3 of this document shows how to Calibrate the Sensitivity of OMR Sensors.

6.18   PROCEDURE FOR MANUALLY SETTING THE SENSITIVITY OF THE OMR SENSORS

Introduction

It is not normally necessary to change the sensitivity of the OMR scanning sensors on Sheet Feeders 1 and 2, as they are adjusted on the Production line. Should the customer's application change, whereby the material colour changes or the scanner appears not to function correctly, then it will be necessary to perform the sensitivity adjustment.

The set-up sheet, form number SDT316 is required when making this adjustment. A reduced size reproduction of this sheet is shown in item 6.11 on page 6-17 of this document. Scanner MUST be positioned correctly over the centre of the scan dash marks.

Procedure

1.   Press Set Up key under the control panel.
2.   Enter 61 and press the Next key.
3.   Select either Sheet Feeder 1 or 2 using the Next key.
4.   Display will show Set OMR Sensitivity Sheet 1 or 2 as selected.
5.   Press the Start key.
6.   Using the Next key, select Manual OMR Set-up Sheet 1 or 2 as selected.
7.   Press the Start key. Display will show Load Blank Sheet: START.
8.   For Sheet Feeder 1, place a BLANK sheet of paper under the set-up sheet. Manually advance the set-up sheet until the "Blank" box is under the sensor.
9.   Press the Start key. Display will show Load Marked Sheet: START.
10.   The sensor light output will pulse slowly in Red. Now manually advance the set-up sheet until the grey (hatched) area is under the sensor.
11.   Press the Start key.
12.   The sensor light output will now be permanent (steady) in either Blue, Red or Green depending upon the paper colour and ink type. Normally for black OMR marks on a white background, expect to see a Blue light.
13.   If the sensor light output flashes rapidly, set-up has failed, and it will be necessary to re-adjust from the beginning of the procedure.
14.   The procedure for Sheet Feeder 2 is the same as for Sheet Feeder 1. However, as the Scanning sensor is mounted below the paper path, it is recommended that you remove Sheet Feeder Tray 1 for easier access. The front of the Set-Up Sheet SDT316 shows the outline of the "Blank" and "Grey" boxes on the rear of the sheet so that you can easily set its position above the scanning sensor.