Claims

1. A method for singulating IC units from a plurality of substrates, the substrates being divided into a sequence of two or more batches in one or more magazines, the method comprising, in a singulation apparatus having a singulation section and a sorting section:

sequentially singulating substrates of a first batch in the singulation section and transporting singulated IC units to the sorting section;

determining that singulated units of a last substrate of the first batch have reached the sorting section;

continuously and sequentially processing substrates of a next batch in the sequence until singulated units of a first substrate of the next batch are ready to be sorted in the sorting section; and

on receiving an indication that singulated units of the last substrate of the first batch have been cleared from the sorting section and a reject bin, continuing sequential processing of substrates of the next batch.

2. A method according to claim 1, wherein said determining comprises determining a boundary between the first batch and the next batch.

3. A method according to claim 2, wherein said determining comprises receiving batch data representing at least a number of substrates in the first batch;

maintaining a count of processed substrates which have reached the sorting section; and

determining when the count of processed substrates equals the number of substrates in the first batch.

4. A method according to any one of claims 1 to 3, wherein at least one batch spans across two or more magazines.

5. A method according to claim 2, wherein said determining comprises detecting a gap between substrates in the one or more magazines.

6. A method according to claim 5, wherein the gap is within a magazine.

7. A method according to claim 6, wherein the magazine is an empty magazine.

8. A method for singulating IC units from a plurality of substrates, the substrates being divided into a sequence of two or more batches in one or more magazines, the method comprising:

receiving batch data representing, for each batch, a batch identifier and a batch count indicating a number of substrates in the batch;

continuously and sequentially singulating substrates of a first batch of the sequence in a singulation section of a singulation apparatus, and transporting singulated IC units to a sorting section of the singulation apparatus;

incrementing a processed count indicating a number of substrates of the first batch which have been processed in the singulation section;

when the processed count equals the batch count for the first batch, sequentially processing substrates of a next batch of the sequence until singulated units of the first substrate of the next batch are ready to be sorted in the sorting section; and

on receiving an indication that singulated units of the last substrate of the first batch have been cleared from the sorting section and a reject bin, continuing sequential processing of substrates of the next batch.

9. A control system for a singulation apparatus having a magazine carrier, a singulation section and a sorting section, the singulation apparatus being configured to receive a plurality of substrates divided into a sequence of two or more batches in one or more magazines, the control system comprising:

at least one control module for communicating with and controlling the singulation apparatus, the at least one control module being configured to:

instruct or causing the magazine carrier to sequentially present substrates of a first batch and a next batch for processing in the singulation section;

determine that singulated units of a last substrate of the first batch have reached the sorting section;

receive a signal indicating that singulated units of the first substrate of the next batch are ready to be sorted in the sorting section; and

on receiving an indication that singulated units of the last substrate of the first batch have been cleared from the sorting section and a reject bin, instruct the singulation apparatus to continue sequential processing of substrates of the next batch.

10. A control system according to claim 9, wherein the at least one control module comprises a first control module for communicating with and controlling the magazine carrier and components of the sorting section, and a second control module for communicating with and controlling the singulation section.

11. A control system according to claim 9 or claim 10, wherein the at least one control module is configured to determine a boundary between the first batch and the next batch.

12. A control system according to claim 11, wherein the at least one control module is configured to:

receive batch data representing at least a number of substrates in the first batch;

maintain a count of processed substrates which have reached the sorting section; and

determine when the count of processed substrates equals the number of substrates in the first batch.

13. A control system according to claim 11 or claim 12, wherein said control module is configured to detect a gap between substrates in the one or more magazines.

14. A non-transitory machine-readable storage medium having stored thereon a program for controlling a singulation apparatus, the singulation apparatus having a magazine carrier, a singulation section and a sorting section, and being configured to receive a plurality of substrates divided into a sequence of two or more batches in one or more magazines, the program comprising instructions for:

instructing or causing the magazine carrier to sequentially present substrates of a first batch and a next batch for processing in the singulation section;

determining that singulated units of a last substrate of the first batch have reached the sorting section;

receiving a signal indicating that singulated units of the first substrate of the next batch are ready to be sorted in the sorting section; and

on receiving an indication that singulated units of the last substrate of the first batch have been cleared from the sorting section and a reject bin, causing the singulation apparatus to continue sequential processing of substrates of the next batch.

15. A non-transitory machine-readable storage medium according to claim 14, further comprising instructions for determining a boundary between the first batch and the next batch.

16. A non-transitory machine-readable storage medium according to claim 15, further comprising instructions for: receiving batch data representing at least a number of substrates in the first batch; maintaining a count of processed substrates which have reached the sorting section; and determining when the count of processed substrates equals the number of substrates in the first batch.

17. A non-transitory machine-readable storage medium according to claim 15, further comprising instructions for detecting a gap between substrates in the one or more magazines.