# Complete Functionality Report

*Billing & Inventory Management System*

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This document covers implemented functionality and edge-case behavior from the current codebase.

## 1. Scope And Method

- Codebase reviewed: Billing & Inventory Management system under BS5.6 - Edited v2.
- Assessment basis: current Python source modules, UI workflows, data-layer logic, validations, reporting/export, role behavior, and recent performance patches.
- This report reflects implemented behavior (as coded), not hypothetical behavior.

## 2. System Architecture Summary

- Desktop application built with Tkinter UI and JSON-file persistence in data folder.
- Main modules: Sales, Purchase, Inventory, Customer Ledger, Due Reports, Item Summary, Supplier Due, Audit Log, Export/Print/PDF.
- Data normalization at startup via consistency layer before app UI launches.
- Role-aware UI behavior: admin, user, shop_manager.

## 3. Authentication And Session Behavior

- Login passwords supported: admin123 (admin), user123 (user), sm123 (shop_manager).
- Invalid password path shows error and blocks access.
- Current audit user context is set after successful login and used by audit logging layer.
- Logout clears role and returns to Login screen.

## 4. Dashboard Navigation And View Lifecycle

- Left navigation sections: Sales, Purchase, Item Summary, Audit, Logout.
- Navigation click-throttle lock prevents rapid repeated view-switch storms.
- New Invoice and New Purchase views are cached; partially-entered form data is retained when switching tabs/sections.
- Other views are rebuilt as transient views.

## 5. Sales (New Invoice) Functional Coverage

- Customer details: name, phone, address with auto-suggestion and auto-fill from customer master.
- Item entry supports typed search + dropdown list selection.
- Item Type field exists and is blank by default (user selectable).
- GST default is 18 and editable per row.
- Stock availability check is enforced before add/update (prevents over-sale).

- Cart operations: add/update, edit selected row, delete selected row.

- Tax and totals: taxable, CGST, SGST, IGST, grand total; balance auto-calculated from paid amount.

- Payment modes available: Cash, UPI, Card, Due.

- Generate Invoice writes sale record, updates stock, writes audit log, updates customer master, generates invoice PDF, and enables print.

- Enter key moves focus to next form section/field for faster data entry.

- Quick-action lock and save lock prevent duplicate operations on rapid button pressing.

## 6. Sales Reports And Due

- Sales Report view shows date/invoice/customer/total/paid/due with summary totals.

- Large sales datasets render in chunks to avoid UI freeze (non-blocking load status).

- Due Report lists invoice-level customer dues only (due > 0) with search, total due display, export buttons.

- Sales Excel export supported from report screen.

## 7. Customer Ledger Functional Coverage

- Filter inputs: customer name, phone, item, from date, to date.

- Date input supports DD-MM-YYYY and YYYY-MM-DD parsing paths.

- Ledger rows show invoice totals/paid/due and highlight due rows.

- Chunked row rendering keeps UI responsive for large histories.

- Payment receive flow: select invoice, validate amount range, update paid/due, write audit log, and add cash ledger entry.

- Export options: Excel and PDF.

## 8. Purchase (New Purchase) Functional Coverage

- Supplier entry supports searchable dropdown and auto-fill of phone/address.

- If supplier does not exist, new supplier is auto-created during save.

- Payment mode options include Other.

- Item entry supports typed suggestions/dropdown; GST default 18 and editable.

- Row lifecycle: add/update, edit selected, delete selected.

- Summary recalculates total and balance from paid amount.

- Save Purchase writes purchase record, updates inventory stock item-wise, writes audit entry, and conditionally posts cash-out ledger entry for cash payment.

- Enter key navigation to next field is implemented.

## 9. Purchase Reporting And Supplier Due Coverage

- Purchase Reports support Date-wise, Item-wise, and Supplier-wise filters.

- Double-click on row opens detailed purchase items report path.

- Export and print pathways are available.

- Purchase Due Report aggregates dues supplier-wise with pending bill count and total due.

- Supplier payment posting updates due, cash ledger, and supplier payment ledger.

- Supplier history popup includes both purchase and payment rows; sorted latest first (reverse chronological).

## 10. Item Summary And Role-Based Access

- Item Summary is fixed alphabetical by item name (A-Z).

- Shop Manager restricted view: select, item, available qty, selling price (purchase price hidden).

- Editable columns by role: shop_manager -> available_qty, selling_price; admin -> available_qty, purchase_price, selling_price.

- Row selection, show-selected-only, and transaction drilldown implemented.

- Item override persistence supported through item summary override storage.

## 11. Audit, Cash, And Traceability

- Audit log write API captures timestamp, user, module, action, reference, before/after payload.

- Audit viewer supports date/user/module filters and now shows reverse chronological order (latest first).

- Cash ledger tracks cash-in and cash-out entries from sales cash receipts, customer payments, purchase cash outflows, and supplier payments.

## 12. Data Consistency And Recovery

- Startup consistency routine sanitizes purchase/sales records, normalizes item naming, and rebuilds inventory from transaction history.

- Missing derived fields (paid, due, grand_total, payment_mode variants) are backfilled when possible.

- Consistency run can skip when file signatures have not changed.

- Rollback snapshot and restore script exist for recovery.

## 13. Export, PDF, And Print Coverage

- Exports include sales, due, purchase reports, purchase due supplier-wise, customer ledger, stock, and item summary (Excel).

- PDF generation includes invoice PDF, due report PDF, purchase due PDF, purchase report PDFs, customer ledger PDF, and payment receipt pathways.

- Direct print integration available through print helper.

## 14. Validations And Edge Cases Handled

- No-item save blocks in invoice and purchase screens.

- Invalid numeric input handling with explicit error messages.

- Insufficient stock check before sales row add.

- Overpayment protection in customer invoice payment screen (pay must be between 1 and due).

- Negative due values clamped to zero in core sales/purchase calculations.

- No-data export paths return info/error instead of crashing.

- Date parse fallback avoids hard crashes on invalid date text.

- UI lock/debounce prevents repeated rapid clicks causing duplicate processing or temporary hangs.

## 15. Known Behavioral Notes / Risks

- Passwords are hardcoded in source (operationally simple, security risk for production).

- JSON file storage has no transaction locking; concurrent external edits may cause race/overwrite risks.

- Some legacy/backup modules remain in project and can cause maintenance confusion if invoked accidentally.

- A few deprecated helper modules (older toplevel UIs) exist but main workflow uses current primary UI classes.

## 16. Overall Functional Status

- Core end-to-end business flows are present and operational: create purchase -> stock update -> create sale -> due/payment settlement -> reporting/export/audit.

- Role visibility controls and most requested workflow refinements are implemented in current codebase.

- Performance hardening exists for heavy report views and repeated click scenarios.

- System is functionally complete for small/medium single-user desktop operations with JSON-backed data.