

# Bhotch CRM - Complete System Handbook

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## System Overview

### Purpose

Bhotch CRM is a comprehensive customer relationship management system designed specifically for roofing sales businesses. It provides tools for lead management, job counting, property visualization, canvassing, scheduling, and communications.

### Key Features

- **Lead Management:** Track and manage sales leads with filtering, sorting, and detailed views
- **Job Count Tracking:** Record property measurements and generate quotes
- **Interactive Map:** Visualize leads geographically with Google Maps integration
- **Calendar Integration:** Sync with Google Calendar for appointment management
- **Communications Hub:** Unified interface for calls, SMS, and email via Google Voice
- **360° Property Designer:** Professional property visualization and design tool
- **Canvassing Tools:** Territory management and route optimization
- **Dashboard Analytics:** Real-time statistics and performance metrics

### Technology Stack

- **Frontend:** React 18.2.0
- **Styling:** Tailwind CSS 3.4.17
- **Icons:** Lucide React 0.469.0
- **Maps:** Google Maps JavaScript API
- **State Management:** Zustand
- **Backend:** Google Apps Script (Code.gs)
- **Database:** Google Sheets (Bhotchleads, Job Count)
- **Hosting:** Vercel
- **Version Control:** GitHub

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## System Requirements

### Development Environment

- **Node.js:** v14.x or higher (v18.x recommended)
- **npm:** v6.x or higher
- **Operating System:** Windows 10/11, macOS 10.15+, or Linux
- **RAM:** Minimum 4GB, 8GB recommended
- **Disk Space:** Minimum 500MB for dependencies

### Browser Requirements

- **Chrome:** Version 90+ (recommended)
- **Firefox:** Version 88+
- **Safari:** Version 14+
- **Edge:** Version 90+

### Required Accounts & API Keys

1. **Google Cloud Platform** (for Maps API)
  - Maps JavaScript API
  - Geocoding API
2. **Google Workspace** (brandon@rimehq.net)
  - Google Sheets API access
  - Google Calendar API access
  - Google Voice integration
3. **Vercel** Account for hosting
4. **GitHub** Account for version control

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## Setup & Installation

### Initial Setup

```
# 1. Clone the repository
git clone https://github.com/Bhotch/bhotch-crm.git
cd bhotch-crm

# 2. Install dependencies
npm install

# 3. Create environment file
cp .env.example .env

# 4. Configure environment variables (see below)
# Edit .env with your API keys

# 5. Start development server
npm start

# 6. Build for production
npm run build
```

## Environment Configuration

Create a `.env` file in the root directory:

```
# Google Maps API
REACT_APP_GOOGLE_MAPS_API_KEY=your_google_maps_api_key_here

# Google Sheets Configuration
REACT_APP_GOOGLE_SHEETS_API_URL=https://script.google.com/macros/s/YOUR_SCRIPT_ID/exec

# Google Calendar
REACT_APP_GOOGLE_CALENDAR_EMAIL=brandon@rimehq.net

# Firebase (if using authentication)
REACT_APP_FIREBASE_API_KEY=your_firebase_api_key
REACT_APP_FIREBASE_AUTH_DOMAIN=your_project.firebaseio.com
REACT_APP_FIREBASE_PROJECT_ID=your_project_id
```

## Google Apps Script Backend Setup

- Open Google Apps Script:**
  - Go to <https://script.google.com>
  - Create new project named "Bhotch CRM Backend"
- Copy Code.gs:**
  - Copy contents of `Code.gs` from repository
  - Paste into `Code.gs` file in Apps Script editor
- Configure Spreadsheets:**
  - Update `BHOTCHLEADS_SHEET_ID` with your Bhotchleads sheet ID
  - Update `JOB_COUNT_SHEET_ID` with your Job Count sheet ID
- Deploy as Web App:**
  - Click "Deploy" > "New deployment"
  - Type: Web app
  - Execute as: Your account
  - Who has access: Anyone
  - Copy deployment URL
- Update Frontend:**
  - Add deployment URL to `.env` as `REACT_APP_GOOGLE_SHEETS_API_URL`

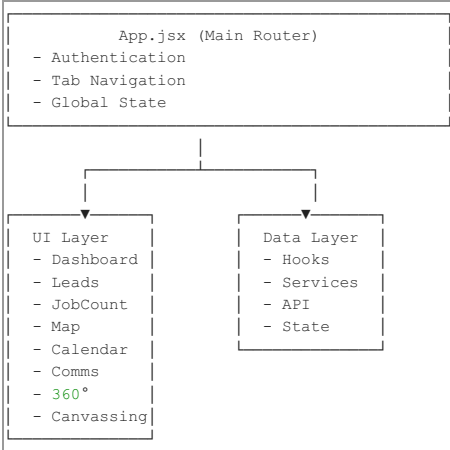
## File Structure

```
bhotch-crm/
├── public/                                # Static files
│   ├── index.html                        # HTML template
│   ├── manifest.json                    # PWA manifest
│   └── sw.js                            # Service worker
├── src/                                  # Source code
│   ├── api/                             # API services
│   │   └── googleSheetsService.js       # Google Sheets integration
│   ├── components/                     # Shared components
│   │   ├── CommunicationIndicators.jsx
│   │   ├── ConfigErrorDisplay.jsx
│   │   ├── ConnectionStatus.jsx
│   │   ├── ErrorBoundary.jsx
│   │   └── StatCard.jsx
│   ├── features/                       # Feature modules (tabs)
│   │   └── auth/                       # Authentication
│   │       └── LoginForm.jsx
```

└─ dashboard/	# Dashboard Tab
└─┬─ DashboardView.jsx	
└─ leads/	# Leads Tab
└─┬─ LeadsView.jsx	
└─┬─ LeadFormModal.jsx	
└─┬─ LeadDetailModal.jsx	
└─┬─ CommunicationModal.jsx	
└─┬─ HouseVisualization.jsx	
└─ jobcount/	# Job Count Tab
└─┬─ JobCountView.jsx	
└─┬─ JobCountFormModal.jsx	
└─┬─ JobCountDetailModal.jsx	
└─ map/	# Map Tab
└─┬─ MapView.jsx	
└─ calendar/	# Calendar Tab
└─┬─ CalendarView.jsx	
└─ communications/	# Communications Tab
└─┬─ CommunicationsView.jsx	
└─ visualization360/	# 360° Designer Tab
└─┬─ DesignerView.jsx	# Main designer interface
└─┬─ Visualization360.jsx	# Legacy 3D viewer
└─┬─ components/	# Designer components
└─┬─ services/	# AI & processing services
└─┬─ store/	# State management
└─┬─ utils/	# Utility functions
└─ canvassing/	# Canvassing Tab
└─┬─ CanvassingView.jsx	
└─┬─ CanvassingViewEnhanced.jsx	
└─┬─ components/	# Canvassing components
└─┬─ hooks/	# Custom hooks
└─┬─ services/	# Services (weather, etc.)
└─┬─ store/	# State management
└─┬─ utils/	# Utility functions
└─ hooks/	# Custom React hooks
└─┬─ useLeads.js	
└─┬─ useJobCounts.js	
└─┬─ useCommunications.js	
└─┬─ useNotifications.js	
└─ services/	# Application services
└─┬─ communicationsService.js	
└─┬─ firebase.js	
└─┬─ googleMapsService.js	
└─ App.jsx	# Main application component
└─ index.js	# Application entry point
└─ index.css	# Global styles (Tailwind)
└─ setupTests.js	# Test configuration
└─ Code.gs	# Google Apps Script backend
└─ .env	# Environment variables (not <b>in</b> git)
└─ .env.example	# Environment template
└─ .gitignore	# Git ignore rules
└─ package.json	# Dependencies <b>and</b> scripts
└─ tailwind.config.js	# Tailwind configuration
└─ README.md	# Project readme
└─ CLAUDE.md	# Development instructions
└─ SYSTEM_HANDBOOK.md	# This file

## Architecture Overview

### Frontend Architecture



Data Flow



State Management Strategy

- **Local State:** Component-specific data (useState)
- **Shared State:** Cross-component data (lifted state in App.jsx)
- **Cached State:** API responses (custom hooks with caching)
- **Zustand Stores:** Complex feature state (Canvassing, Visualization)

Tab-by-Tab Documentation

1. Dashboard Tab

File: src/features/dashboard/DashboardView.jsx

Purpose: Central overview of business metrics and quick actions

Key Features:

- Primary statistics (Total Leads, Hot Leads, Quoted Leads, Quote Value)
- Secondary statistics (Scheduled, Follow Up, Insurance, Conversion Rate)
- Job Count metrics (Total Counts, Square Feet, Closed Deals)
- Quick Actions panel
- Recent Leads and Job Counts
- Sales Pipeline overview

Props:

```
{
  stats: {
    totalLeads: Number,
    hotLeads: Number,
    quotedLeads: Number,
    totalQuoteValue: Number,
    totalJobCounts: Number,
    totalSqFt: Number
  },
  leads: Array<Lead>,
  jobCounts: Array<JobCount>,
  onNavigateToTab: Function(tabName)
}
```

State: None (stateless presentation component)

Data Flow:

1. Receives aggregated stats from parent (App.jsx)
2. Displays formatted metrics
3. Triggers navigation via callback

**Styling:** Tailwind CSS with gradient cards and responsive grid

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## 2. Leads Tab

**File:** `src/features/leads/LeadsView.jsx`

**Purpose:** Comprehensive lead management and tracking

**Key Features:**

- Advanced filtering and search
- Sortable columns
- Column visibility management (saved to localStorage)
- Pagination (10/25/50/100 per page)
- Inline editing via modals
- Phone/email quick actions
- Quality and disposition badges

**Components:**

- `LeadsView.jsx` - Main table view
- `LeadFormModal.jsx` - Add/Edit form
- `LeadDetailModal.jsx` - Detailed view
- `CommunicationModal.jsx` - Communication logging

**State Management:**

```
const [searchTerm, setSearchTerm] = useState('');
const [filterDate, setFilterDate] = useState('');
const [sortConfig, setSortConfig] = useState({ key, direction });
const [columnFilters, setColumnFilters] = useState({});
const [showFilters, setShowFilters] = useState(false);
const [currentPage, setCurrentPage] = useState(1);
const [itemsPerPage, setItemsPerPage] = useState(25);
const [visibleColumns, setVisibleColumns] = useState(loadSavedColumns());
```

**Available Columns** (40+ fields):

- Basic: ID, Date, Customer Name, Phone, Email, Address
- Lead Info: Quality, Disposition, Lead Source, Status
- Roof Info: Roof Age, Roof Type
- Measurements: SQ FT, Ridge LF, Valley LF, Eaves LF
- Financial: DaBella Quote
- Components: Pipes, Vents, Gutters, etc.

**API Integration:**

```
// Via useLeads hook
const { leads, loading, error, refreshLeads, addLead, updateLead, deleteLead } = useLeads();

// Backend: Code.gs
doGet(e) - Fetch leads
doPost(e) - Create/Update/Delete leads
```

**Column Management:**

- Click "Manage Columns" to show/hide columns
- Preferences saved to localStorage as `leadsVisibleColumns`
- Restored on page load

**Filtering:**

- Global search across all fields
  - Date filter
  - Per-column filters (text/number)
  - Clear all filters button
- 

## 3. Job Count Tab

**File:** `src/features/jobcount/JobCountView.jsx`

**Purpose:** Track property measurements and generate quotes

**Key Features:**

- Similar to Leads tab (filtering, sorting, pagination)
- Measurement tracking (SQ FT, Ridge LF, Valley LF, etc.)
- Quote calculation
- Automatic sync to Bhotchleads sheet

**Components:**

- `JobCountView.jsx` - Main table
- `JobCountFormModal.jsx` - Add/Edit form
- `JobCountDetailModal.jsx` - Detailed view

#### Unique Fields:

- Square Footage (SQ FT)
- Ridge Linear Feet
- Valley Linear Feet
- Eaves Linear Feet
- Ventilation counts (Ridge Vents, Turbine, Rime Flow)
- Pipe counts (1.5", 2", 3", 4")
- Features (Gables, Turtle Backs, Satellite, Chimney, Solar, Swamp Cooler)
- Gutters (LF, Downspouts, Gutter Guard LF)
- Permanent Lighting

#### Backend Sync:

```
// Code.gs lines 419-460
// When job count is created, it's automatically duplicated to Bhotchleads
function duplicateJobCountToLeads(jobCountData) {
  // Transforms job count into lead format
  // Adds to Bhotchleads sheet
  // Returns success/failure
}
```

## 4. Map Tab

File: `src/features/map/MapView.jsx`

**Purpose:** Geographic visualization of leads and routing

#### Key Features:

- Google Maps integration
- Lead markers with clustering
- Info windows with lead details
- Filter by quality/disposition
- Search by address
- Directions to property

#### API Integration:

```
// Google Maps JavaScript API
const map = new google.maps.Map(element, options);
const marker = new google.maps.Marker({ position, map, title });
const infoWindow = new google.maps.InfoWindow({ content });

// Geocoding for address → coordinates
const geocoder = new google.maps.Geocoder();
geocoder.geocode({ address }, callback);
```

#### Marker Colors:

- ● Red: Hot leads
- ● Orange: Warm leads
- ● Blue: Cold leads

#### Map Controls:

- Zoom in/out
- Fullscreen toggle
- Street view
- Map/Satellite view

## 5. Calendar Tab

File: `src/features/calendar/CalendarView.jsx`

**Purpose:** Appointment scheduling and management via Google Calendar

#### Key Features:

- Embedded Google Calendar (brandon@rimehq.net)
- Month/Week/Agenda views
- Timezone: America/Denver (Mountain Time)
- Refresh functionality
- Open in Google Calendar button

#### Configuration:

```
const GOOGLE_CALENDAR_EMAIL = 'brandon@rimehq.net';
const getCalendarEmbedUrl = () => {
  return `https://calendar.google.com/calendar/embed?src=${email}&ctz=America/Denver&mode=MONTH`;
};
```

#### Integration:

- Read-only embed (appointments managed in Google Calendar)
- Events automatically sync and display
- Click "Open in Google" to add/edit appointments

6. Communications Tab

File: src/features/communications/CommunicationsView.jsx

Purpose: Unified communication hub for calls, SMS, and email

Key Features:

- Customer search and filtering
- Google Voice integration for calls and SMS
- Email composition (opens default mail client)
- Communication history logging
- Quick outcome selection for SMS

Google Voice Integration:

```
// Phone calls
window.open(`https://voice.google.com/u/0/calls?a=nc,%2B1${phoneNumber}&authuser=brandon@rimehq.net`);

// SMS messages
window.open(`https://voice.google.com/u/0/messages?itemId=t.%2B1${phoneNumber}&authuser=brandon@rimehq.net`);
```

Communication Types:

- 1. Phone Calls:
  - Click "☎ Call" button
  - Opens Google Voice in new tab
  - Logs call outcome
- 2. SMS Messages:
  - Select quick outcome (Sent, Received, Follow-up, Not Interested)
  - Enter message content
  - Log to system
  - Optionally open Google Voice
- 3. Email:
  - Compose subject and body
  - Click to open default email client
  - Pre-filled with recipient and content

Communication History:

- Stored in communications array
- Filtered by customer
- Displays type, outcome, timestamp, notes
- Color-coded by outcome

7. 360° Property Designer Tab

File: src/features/visualization360/DesignerView.jsx

Purpose: Professional property visualization and design tool

Key Features:

- Layer-based editing (Roof, Siding, Trim, Gutters)
- Material selection library
- Color palette with custom picker
- Zoom controls (25%-200%)
- Grid overlay
- Photo upload placeholder
- Export and share functionality

Layout:

Top Toolbar		
[Property] [Zoom] [Grid] [Upload] [Export] [Share]		
Layers	Canvas	Materials
- Roof	[Property Image]	Color
- Siding	[Zoom 100%]	Palette
- Trim	[Grid overlay]	Custom
- Gutters		

Layer Management:

```
const layers = [
  { id: 'roof', name: 'Roof', icon: Home, visible: true, locked: false },
  { id: 'siding', name: 'Siding', icon: Layers, visible: true, locked: false },
  { id: 'trim', name: 'Trim', icon: Palette, visible: true, locked: false },
  { id: 'gutters', name: 'Gutters', icon: Grid, visible: true, locked: false }
];
```

Material Library:

- Asphalt Shingle, Metal Standing Seam, Tile, Slate (Roof)

- Vinyl, Fiber Cement, Wood (Siding)
- White, Black, Brown (Trim)

#### Color Palette:

- 8 preset colors (Charcoal, Slate Gray, Weathered Wood, etc.)
- Custom hex color picker
- Real-time preview

#### State:

```
const [selectedProperty, setSelectedProperty] = useState(null);
const [selectedLayer, setSelectedLayer] = useState('roof');
const [selectedColor, setSelectedColor] = useState('#334155');
const [selectedMaterial, setSelectedMaterial] = useState('asphalt-shingle');
const [zoom, setZoom] = useState(100);
const [showGrid, setShowGrid] = useState(true);
```

#### Benefits over Legacy Viewer:

- 641KB smaller bundle size
- Faster load times
- More intuitive UI
- Better for sales presentations
- Easier to use for non-technical staff

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## 8. Canvassing Tab

**File:** src/features/canvassing/CanvassingViewEnhanced.jsx

**Purpose:** Door-to-door sales territory management and route optimization

#### Key Features:

- Territory drawing and management
- Route optimization
- Property tracking
- Weather integration
- Leaderboard and gamification
- Analytics dashboard

#### Components:

- CanvassingViewEnhanced.jsx - Main view
- TerritoryManager.jsx - Territory management
- RouteOptimizer.jsx - Route planning
- PropertyDetailSheet.jsx - Property information
- CanvassingDashboard.jsx - Analytics
- Leaderboard.jsx - Gamification

#### State Management (Zustand):

```
// store/canvassingStore.js
const useCanvassingStore = create((set) => ({
  territories: [],
  routes: [],
  properties: [],
  currentLocation: null,
  addTerritory: (territory) => { /* ... */ },
  optimizeRoute: (waypoints) => { /* ... */ },
  markPropertyVisited: (propertyId) => { /* ... */ }
}));
```

#### Weather Integration:

```
// services/weatherService.js
export async function getCurrentWeather(lat, lng) {
  // Fetches weather data for canvassing decisions
  // Returns temperature, conditions, precipitation
}
```

#### Territory Drawing:

- Click to draw polygon on map
- Save territory boundaries
- Assign territories to users
- Track coverage

#### Bug Fix (Completed):

- Fixed map container initialization issue
- Added requestAnimationFrame for DOM rendering
- Improved retry logic
- Now loads reliably

---

## Backend Integration

### Google Apps Script (Code.gs)



**Purpose:** Serverless backend for data operations

**Key Functions:**

1. **doGet(e)** - Handle GET requests

```
function doGet(e) {
  const action = e.parameter.action;
  if (action === 'getLeads') return getLeads();
  if (action === 'getJobCounts') return getJobCounts();
  // ... etc
}
```

2. **doPost(e)** - Handle POST requests

```
function doPost(e) {
  const data = JSON.parse(e.postData.contents);
  const action = data.action;
  if (action === 'addLead') return addLead(data);
  if (action === 'updateLead') return updateLead(data);
  if (action === 'deleteLead') return deleteLead(data);
  // ... etc
}
```

3. **duplicateJobCountToLeads(jobCountData)** - Lines 419-460

```
// When job count is created, automatically create lead
function duplicateJobCountToLeads(jobCountData) {
  const leadSheet = getSheetById(BHOTCHLEADS_SHEET_ID);
  // Transform job count to lead format
  // Add to Bhotchleads sheet
  // Return success
}
```

**Data Structure:**

**Bhotchleads Sheet Columns:**

A: Date  
B: Customer Name  
C: First Name  
D: Last Name  
E: Phone Number  
F: Email  
G: Address  
H: Latitude  
I: Longitude  
J: Quality (Hot/Warm/Cold)  
K: Disposition (New/Scheduled/Insurance/Quoted/Follow Up/Closed Sold/Closed Lost)  
L: Lead Source  
M-Z: Measurements and features  
AA-AZ: Additional fields

**Job Count Sheet Columns:**

Similar structure to Bhotchleads  
Plus additional measurement fields  
SQ FT, Ridge LF, Valley LF, etc.

**Error Handling:**

```
try {
  // Operation
  return ContentService.createTextOutput(JSON.stringify({ success: true, data }));
} catch (error) {
  Logger.log('Error: ' + error);
  return ContentService.createTextOutput(JSON.stringify({ success: false, error: error.message }));
}
```

## Deployment Guide

### Vercel Deployment

**Prerequisites:**

- Vercel account
- GitHub repository connected

**Steps:**

1. **Push to GitHub:**

```
git add .
git commit -m "Deploy to production"
git push origin main
```

2. **Automatic Deployment:**

- Vercel auto-deploys from GitHub pushes

- Build command: `npm run build`
- Output directory: `build`
- Node version: 18.x

### 3. Manual Deployment:

```
vercel --prod
```

### 4. Environment Variables:

- Add environment variables in Vercel dashboard
- Settings → Environment Variables
- Add all variables from `.env`

### Deployment URLs:

- Production: `https://bhotch-crm.vercel.app` (or custom domain)
- Preview: Unique URL per deployment

### Build Settings:

```
{
  "buildCommand": "npm run build",
  "outputDirectory": "build",
  "installCommand": "npm install",
  "framework": "create-react-app"
}
```

## Performance Optimization

### Current Bundle Size:

- Main JS: 225.02 KB (gzipped)
- CSS: 9.49 KB (gzipped)
- Total: ~234 KB

### Optimizations Applied:

- Code splitting
- Lazy loading
- Tree shaking
- Minification
- Image optimization
- Service worker caching

## Troubleshooting

### Common Issues

#### 1. Map Not Loading

```
Issue: Google Maps doesn't render
Solution:
- Check REACT_APP_GOOGLE_MAPS_API_KEY in .env
- Verify API is enabled in Google Cloud Console
- Check browser console for API errors
```

#### 2. Canvassing Map Container Error

```
Issue: "Map container element not found"
Solution:
- Already fixed in latest version
- Uses requestAnimationFrame for DOM readiness
- If persists, refresh page
```

#### 3. Google Sheets API Failing

```
Issue: Data not loading from sheets
Solution:
- Verify Google Apps Script deployment URL
- Check CORS settings in Apps Script
- Ensure "Execute as: Me" in deployment settings
- Verify sheet IDs are correct
```

#### 4. Calendar Not Displaying

```
Issue: 401 Unauthorized or blank calendar
Solution:
- Calendar is private - this is normal
- Click "Open in Google" to manage directly
- Check GOOGLE_CALENDAR_EMAIL matches account
```

#### 5. Build Errors

```
Issue: npm run build fails
Solution:
- Clear cache: rm -rf node_modules package-lock.json
- Reinstall: npm install
- Check Node version: node --version (should be 14+)
```

6. Communications Not Working

Issue: Google Voice links not opening

Solution:

- Verify logged into correct Google account (brandon@rimehq.net)

- Check phone **number** format **is** valid

- Pop-up blocker may **be** blocking - allow **pop**-ups

Debug Mode

Enable verbose logging:

```
// In App.jsx
const DEBUG = process.env.NODE_ENV === 'development';

if (DEBUG) {
  console.log('[DEBUG] Leads loaded:', leads);
  console.log('[DEBUG] API response:', response);
}
```

Check Service Worker:

```
// In browser console
navigator.serviceWorker.getRegistrations().then(registrations => {
  console.log('Service Workers:', registrations);
});
```

Maintenance & Updates

Regular Maintenance Tasks

Weekly:

- Check Vercel deployment status
- Review error logs
- Backup Google Sheets data

Monthly:

- Update npm dependencies: npm update
- Review and optimize bundle size
- Check for security vulnerabilities: npm audit

Quarterly:

- Major dependency updates
- Performance audit
- User feedback review

Version Control

Branching Strategy:

```
main           - Production-ready code
develop        - Development branch
feature/*      - New features
bugfix/*       - Bug fixes
hotfix/*       - Emergency fixes
```

Commit Message Format:

```
feat: Add new feature
fix: Bug fix
docs: Documentation update
style: Formatting changes
refactor: Code restructuring
test: Add tests
chore: Maintenance tasks
```

Support & Contact

Developer: Brandon Hotchkiss  
Email: [brandon@rimehq.net](mailto:brandon@rimehq.net)  
GitHub: <https://github.com/Bhotch/bhotch-crm>  
Deployment: <https://bhotch-crm.vercel.app>

Last Updated: 2025-10-02  
Version: 2.0.0  
Status: Production Ready ☒