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# VC5090 Vehicle Computer Preliminary Operation Description

Revision 1.0

# 1. INTRODUCTION

This document is technical operation description of the vehicle computer VC5090.

The architecture of VC5090 is designed to support a Forklift terminal application operation in the Windows CE 5.0 environment. Shakespeare is a wireless data terminal which can run in industrial environment.

The primary design goals of VC5090 Terminal are:

- **Processor:** Intel X-scale Bulverde processor PXA270 624MHz
- **Real-Time Clock:** Internal RTC built in the Processor which will be a year 2000 compliant RTC with a minimum resolution of 0.1 second and accuracy of  $\pm 1$  minute per 24 hours. The Shakespeare will automatically shut down and maintain the RTC integrity for at least 72 hours which is powered by internal backup battery when both external power supply and UPS is absent or UPS insufficient power.
- **Memory**
  - a) Strata Flash Memory for OS: scalable 32MB/64MB
  - b) SDRAM: Base 64MB, upgradeable to 256MB
  - c) NAND Flash Memory for file system: 64MB
  - d) Flash Memory for file System: up to 224MB (Expansion using Symbol approved SD card)
- **Secure Digital Slots:** One (1) SD/MMC card slot of which SDIO card will provide 4-bit support
- **PCMCIA Slot:** a debug port is for catering of the debug board (Symbol Part Number: DV24-66218-01)
- **I/O Ports**
  - a) Two (2) standard RS232 with 5Vdc (500mA) power output controlled by software
  - b) One (1) USB host port
  - c) One (1) USB OTG (On-The-Go) port which connects a USB host connector and a slave connector, but these two ports could not function at same time.
  - d) Wireless LAN: A 802.11b/g module Photon Radio is integrated in Shakespeare
  - e) Audio port: Support Audio-headset (external earpiece and microphone), external speaker
- **Keypad:**
  - a) One (1) integrated a 65 alphanumeric keypad (Juliet Version Only)
  - b) One (1) quick access keypad with 5 keys (Power ON/OFF, back light up/down, and 3 user programmable keys)

- **Display:** Shakespeare Mother board supports Full size 12.1" SVGA (800x600 pixel resolution) colour display or Romeo model and half size SVGA (800x320 pixel resolution) colour display for Juliet model.
- **Touch Panel:** A 4-wire resistive touch panel with H-3 hardness for a graphic digitizer overlaying the entire display available.
- **Status Indicators:**
  - a. Power indication: LED on user interface board and task tray
  - b. Battery level and battery charging status: task tray indication
  - c. Shift and other keyboard modes indication: LED in keyboard.
  - d. RF association, activity, and signal strength indication: task tray
- **Power**
  - a) Peripheral power: Each serial port has a 5V/500mA power supply to power external device
  - b) Internal PSU: The input for PSU is 9~72Vdc and output is 12Vdc with 5.5A when the temperature is higher than 10°C and 9A when the temperature lower than 10°C.
  - c) Back up battery: A 3-cells in serial of Ni-MH rechargeable battery pack (3.6V/0.7A) is designed in to maintain the RTC and memory for a minimum of 72 hours when both external main power and UPS battery are removed. The battery is charged automatically when the power come back.
  - d) UPS backup Batteries and Charger (Option): A daughter module is designed for UPS backup battery pack charging and voltage boost up. Two (2) cells of Li-Ion battery in series (7.4V/2A) to keep the unit operating for at least 15 minutes (1 hour preferred) when external power is removed. The rapid charging time for the UPS is two hours.
  - e) Power Management: Power management is implemented to provide the required operating time while maintaining the mobility functionality including maintaining radio state during low power modes. When the external power absence is detected, the system will limit the peripherals' power such as limiting LCD backlight brightness and turn OFF the heaters.
- **Heater**
  - a) Keyboard heater: a thermostat controlled heater is designed in the keyboard to avoid the build up of ice to maintain optimal performance in freezer environments
  - b) Display heater: a thermostat controlled heater is designed on mother board to maintain the display to work in its specified temperature range while the terminal is in an ambient -30°C environment.

- **WLAN:** Photon Radio is integrated in Shakespeare system to provide 802.11b & g wireless local area network (WLAN).
- **WPAN (Bluetooth):** A Bluetooth module specified by customer is integrated on mother board for WPAN.
- **Radio Antennas:**
  - a) WLAN antenna: two 802.11 b/g internal patch antenna are designed in Shakespeare system to support WLAN diversity. There is an external SMA RF connector to support a Patch Antenna for improved RF performance. When plugging the external antenna into the terminal the radio should automatically switch out one diversity antenna and use the external antenna.
  - b) Bluetooth antenna: Blue tooth antenna is built in Bluetooth module.
- **RFID (Option):** A RFID daughter module specified by customer is designed in Shakespeare through a serial port.
- **Sound**
  - a. Internal Speakers: two internal speakers are designed for both beeper functionality and voice functionality.
  - b. External audio interface: an external audio interface support a headset and pair of speaker.
- **Humidity Sensor Interface**