



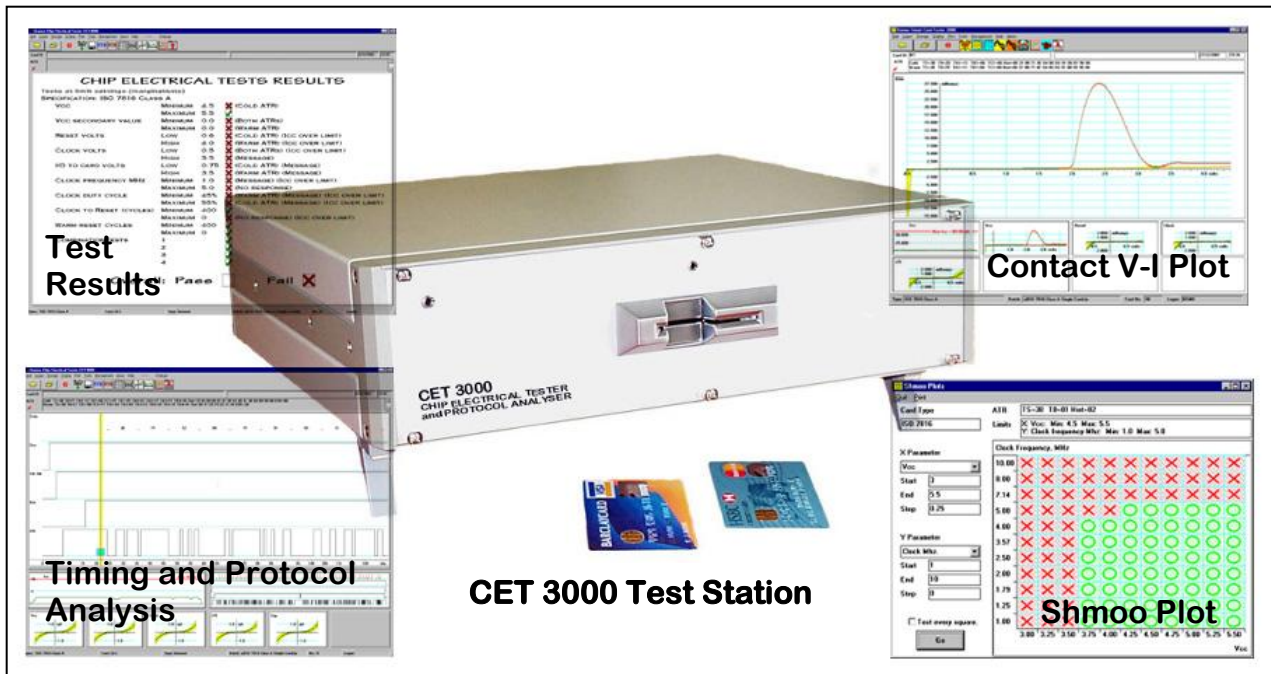
# CET 3000

## Chip Electrical Tester and Protocol Analyser

A vital test tool for Chip Card (ICC) Manufacturers, Personalisers and Issuers

Barnes CET 3000 is a terminal simulator designed to give card manufacturers, personalisers and issuers the means of validating and analysing ICC electrical & protocol performance at a fraction of the cost of semiconductor industry test equipment.

- QC/Production: Automatic test of ICC conformance to ISO, EMV and GSM level 1 specifications.
- Engineering Analysis: Expert technical analysis of ICC performance within and beyond specification limits.



**CET 3000 Test Station**

### CET 3000 Overview

CET 3000 is a cost effective, Windows® based stand alone desk-top unit, under full speed USB control. It is designed for sampling Quality Control of ICC's by non-skilled operators and for expert technical analysis of new, reject and returned cards enabling inward QC inspection and identification and management of chip failure situations with the chip vendors.



## CET 3000 Operational Features

**Electrical Characteristics Test-** The current/voltage curve for each active contact on the card is plotted, and compared (automatically) against expected values. This test detects broken bond wires, short and open circuits, damage of input circuits by Electrostatic Discharge, defective chips etc.

**Protocol Timing-** Control (margination) of all timings generated by the CET3000. Variation of individual bit times within a byte possible. Measurements recorded in reports and viewable in a logic analyser display.

**ATR/Message Test-** CET 3000 includes the facility to create and send commands to the card, and to check and display ICC response. The ICC is powered and a test message is sent; both Cold and Warm Answer To Reset (ATR) responses as well as the APDU/TPDU responses are received and displayed.

**Electrical Margin Tests-** The Electrical Margination tests include repeating the ATR/Message tests at programmable sets of values for Supply ( $V_{CC}$ ), Clock, Reset & I/O voltages, Clock frequency & duty cycle.

**Current Monitoring Test-** The standard test includes automatic continuous monitoring of the supply current ( $I_{CC}$ ). Spot checks are made on the Reset, Clock (static) and I/O lines.

**Shmoo Plot Tests-** This powerful automatic test allows any two parameters (eg Vcc and frequency) to be varied over selected ranges (outside the ISO etc specifications if needed). ATR and APDU message reply is checked for validity at each set of conditions and a plot of "operating envelope" for the ICC is produced.

**Scripting-** The optional Developer facility offers test and application script development using Tcl (Tool Control Language). This enables the tests performed by the CET3000 to be customised with maximum ease, including modifying CET 3000 test scripts and adding user applications into the test process.

**Calibration-** Automatic by reference to internal precision reference standard components, or by reference to external standard voltage and resistance sources.

**Results storage-** Test results stored to database; recall and batch test facility; programmable test limits; script driven printable report; display and colour print of graphical results, logon, user control, log of usage.

## CET3000 Technical Summary

Use CET 3000 to test level 1 compliance against ISO 7816, EMV 2000 v 4.1, GSM 11.11 etc specifications:

- Supports both T=0 and T=1 protocols
- Selectable clock speeds from 200KHz to 20MHz
- Voltage range -0.3 to 6v including support for 1.8v cards
- Clock duty cycle variable from 30:70 to 70:30
- Control parity error injection and manipulate protocol timings
- Measurement of card communication timings down to bit level, to nearest clock cycle
- Run user applications whilst testing
- [EMV Card Level 1 Protocol Version 4.1.a approved test scripts.](#)

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