

Maxon Telecom Co., Ltd.

MX-5020

CALIBRATION AND MEASUREMENT PROCEDURE

TECHNICAL DESCRIPTION

Revision 2.0

PROPRIETARY INFORMATION

The information contained in this document is commercially confidential and must not be disclosed to third parties without prior written permission.

1. Scope

This document is briefly describes calibration and measurement process for MX-5020, GSM/DCS/PCS Tri- band handy cellular phone (hereafter MX-5020).

2. RF Calibration and Measurement

The RF calibration and measurement process should be made in mass-production process to confirm that the basic radio performance variation due to component characteristics was correctly calibrated to meet the GSM specification..

The Automatic Calibration Software (hereafter AutoCal) will calibrate following characteristics;

- a) Transmitter/Receiver frequency accuracy - CCXO (Capacitor Controlled XTAL Oscillator)
- b) Receiver Gain - RxGain
- c) I/Q amplitude and phase imbalance - TxIQ
- d) Transmitter Power – TxPower

The general requirement for RF Calibration and Measurement system is as follows;

- e) Windows PC (Automatic Calibration Software and Measurement Software need to be installed)
- f) GPIB I/F Board - National Instruments PCI-GPIB
- g) GSM Tester - HP 8922P (in case of RF Calibration)
- h) GSM Tester - CMD55 (in case of RF Measurement)
- i) DC power supply - HP E3610A or equivalent one
- j) Interface Adapter for MX-5020

2.1. RF Calibration Process

Attach the battery eliminator pack onto the handset and configure cable connection as shown in Fig.2-1.

Execute the AutoCal installed on PC.

The calibrated data is stored to Nonvolatile memory :NVM of the phone after calibration is finished.

The calibration procedure Flow Chart is shown in Figure 2-2.

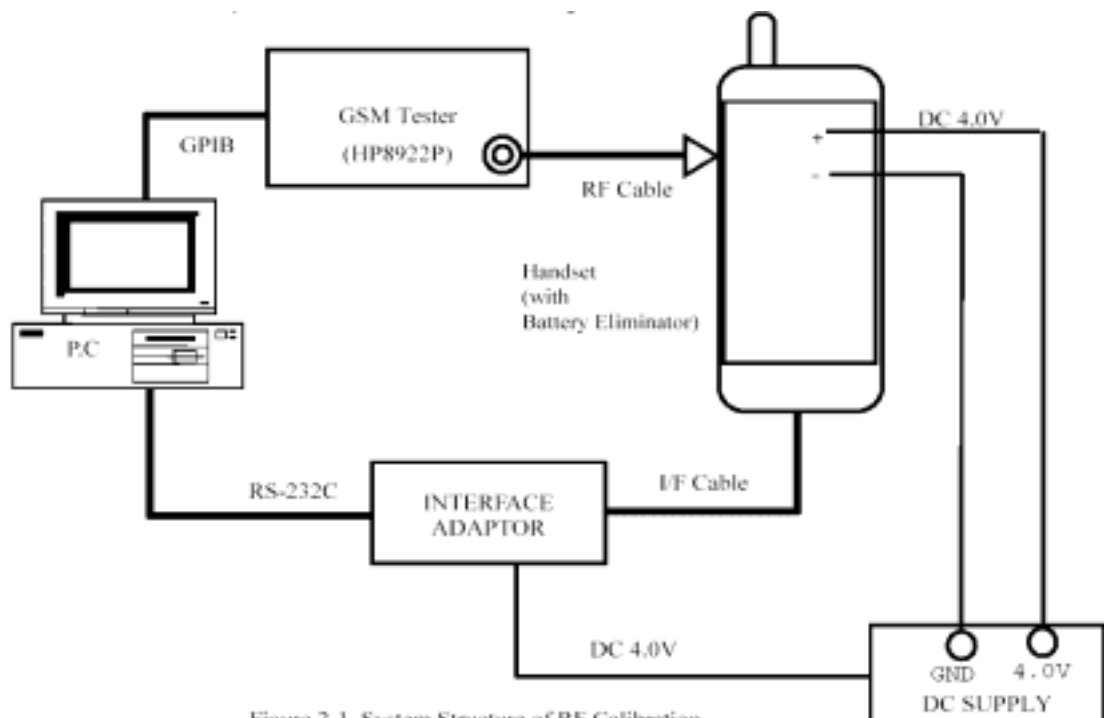


Figure 2-1. System Structure of RF Calibration

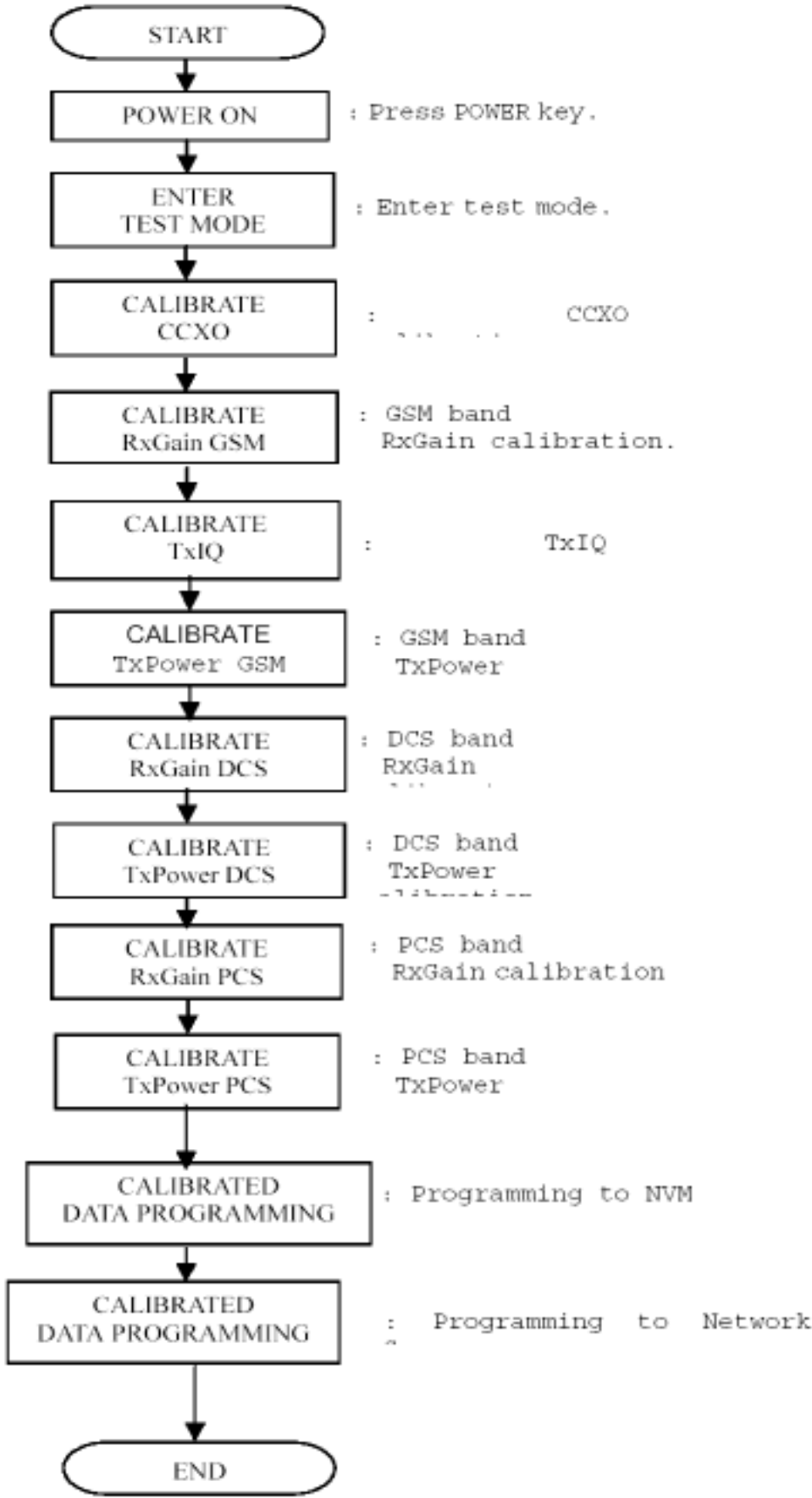


Figure 2-2. RF Calibration Procedure

2.2. Measurement Process

Attach the battery eliminator pack onto the handset and configure cable connection as shown in Fig.2-3.

Execute the AutoMeas installed on PC.

The measurement items in this process are as follows;

- a) Power: Transmitter Output Power Level
- b) Burst Mask : Power vs Time template mask
- c) Rx Level: Reported RSSI Level
- d) Frequency and Phase Error
- e) BER: ClassII RBER
- f) The measurement process flowchart is shown in Figure 2-4.

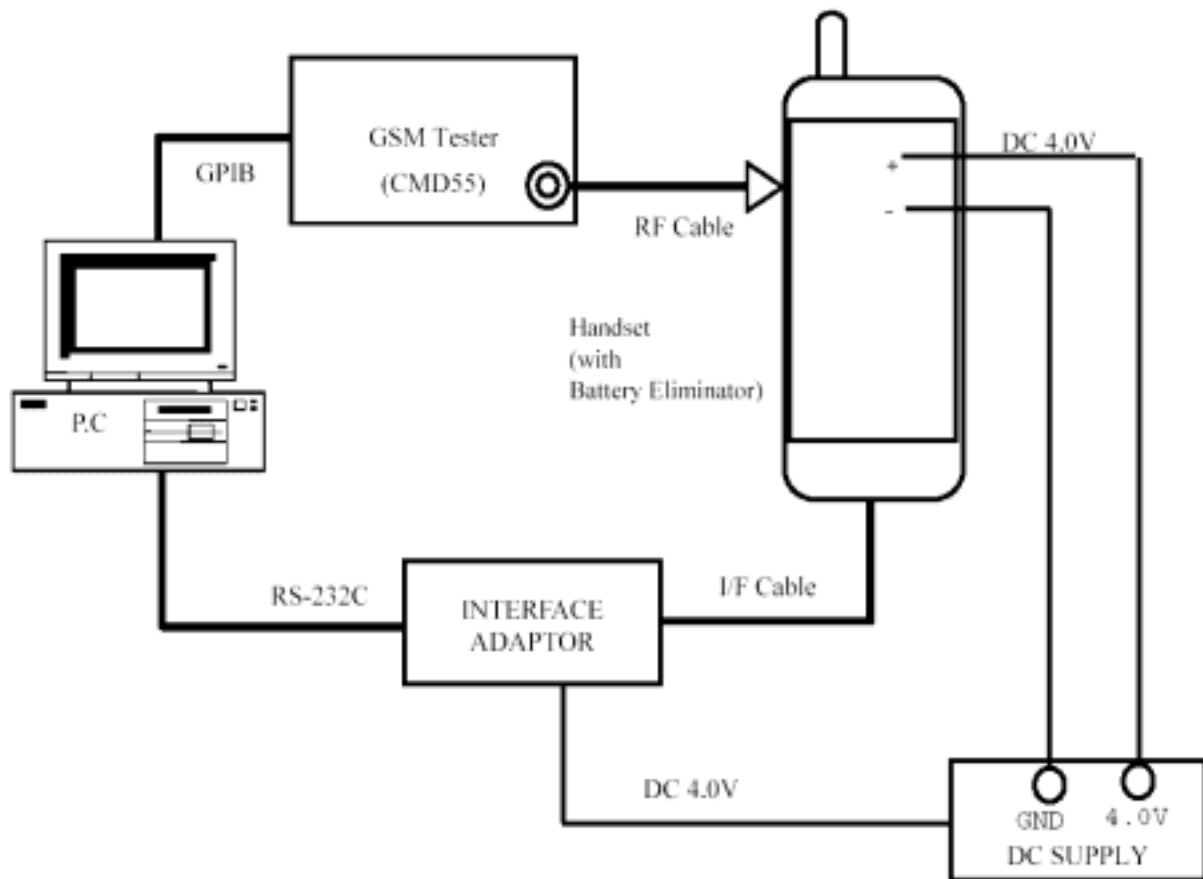


Figure 2-3. System Structure of RF Measurement

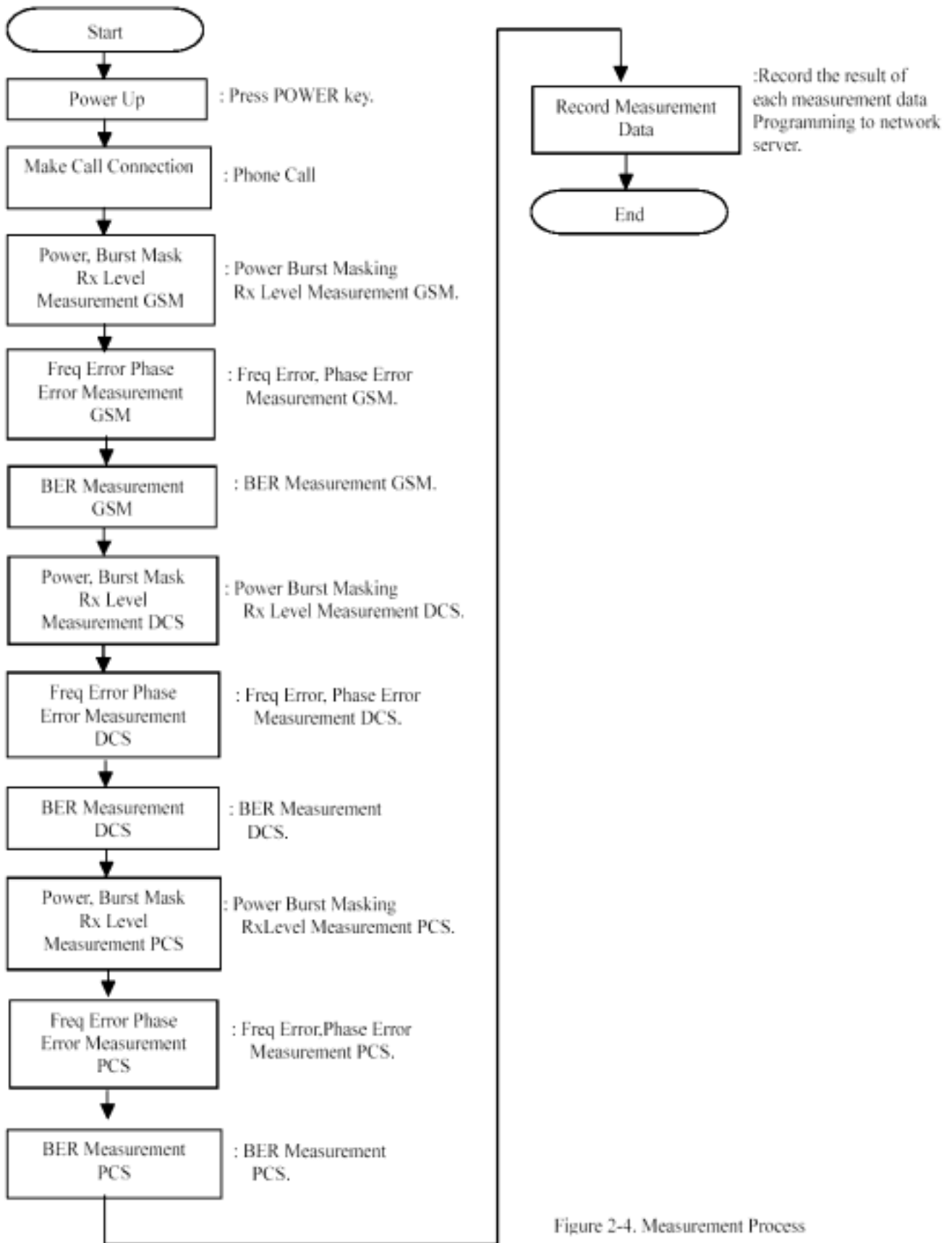


Figure 2-4. Measurement Process

3. Battery Calibration

The Battery Calibration process should be made in mass-production to enable the correct battery - related functions such as battery type recognition, battery voltage detection, and battery charging functions.

The battery calibration will calibrate the analog voltage detection value of A/D converter of the phone by applying voltage to below each terminal from external DC power supply.

- a) Battery voltage
 - b) Battery type voltage
 - c) Maximim charging voltage for attached battery
- Charging current

3.3. Calibration Process

Attach the battery eliminator pack to the handset and configure cable connection as shown in Fig.3-1.

Execute the Battery Calibration Software installed on PC.

The calibrated data will be stored to NVM of the phone after calibration is finished.

The calibration procedure is shown in Figure 3-2.

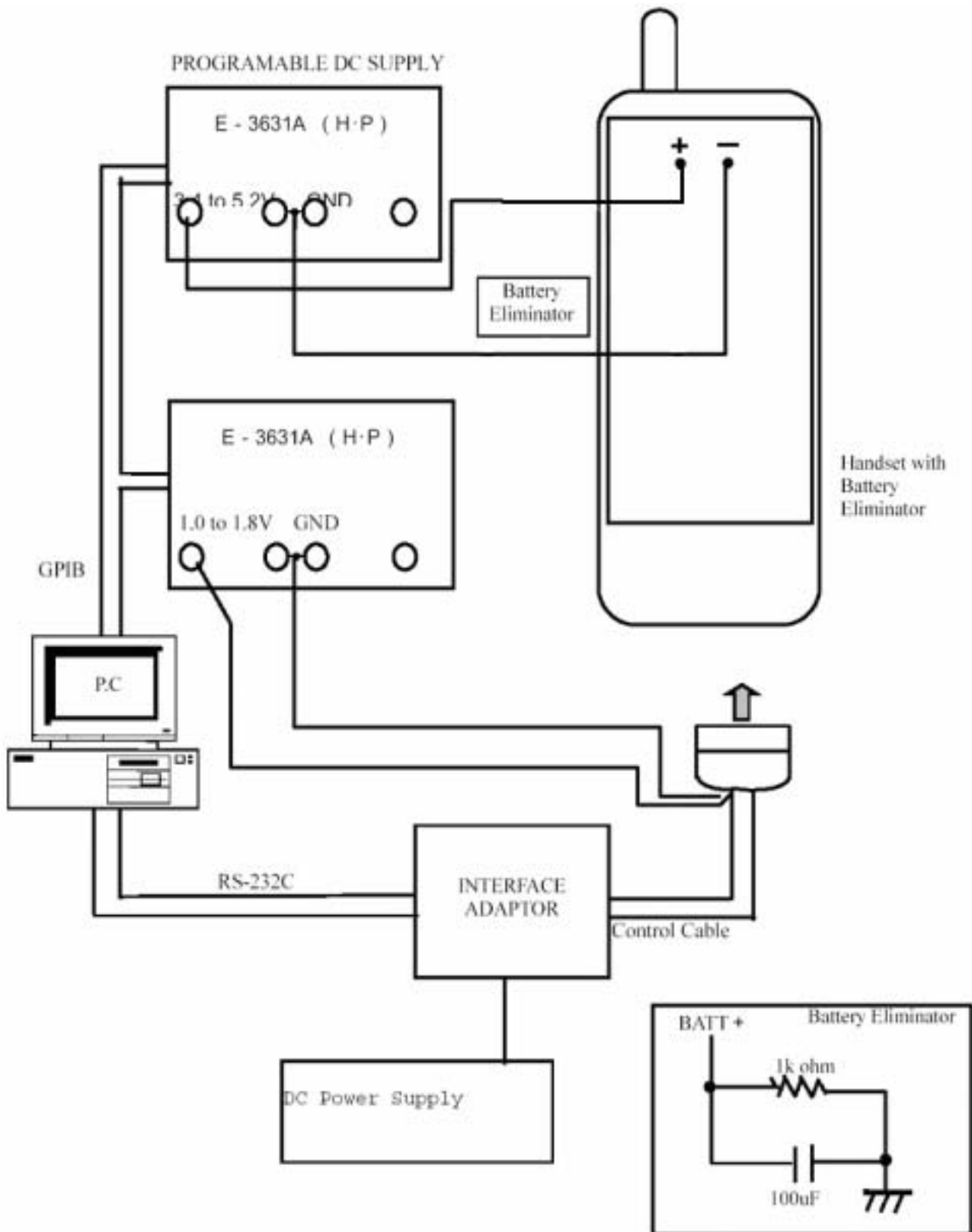


Figure 3-1. Battery Calibration - System Configuration Block Diagram

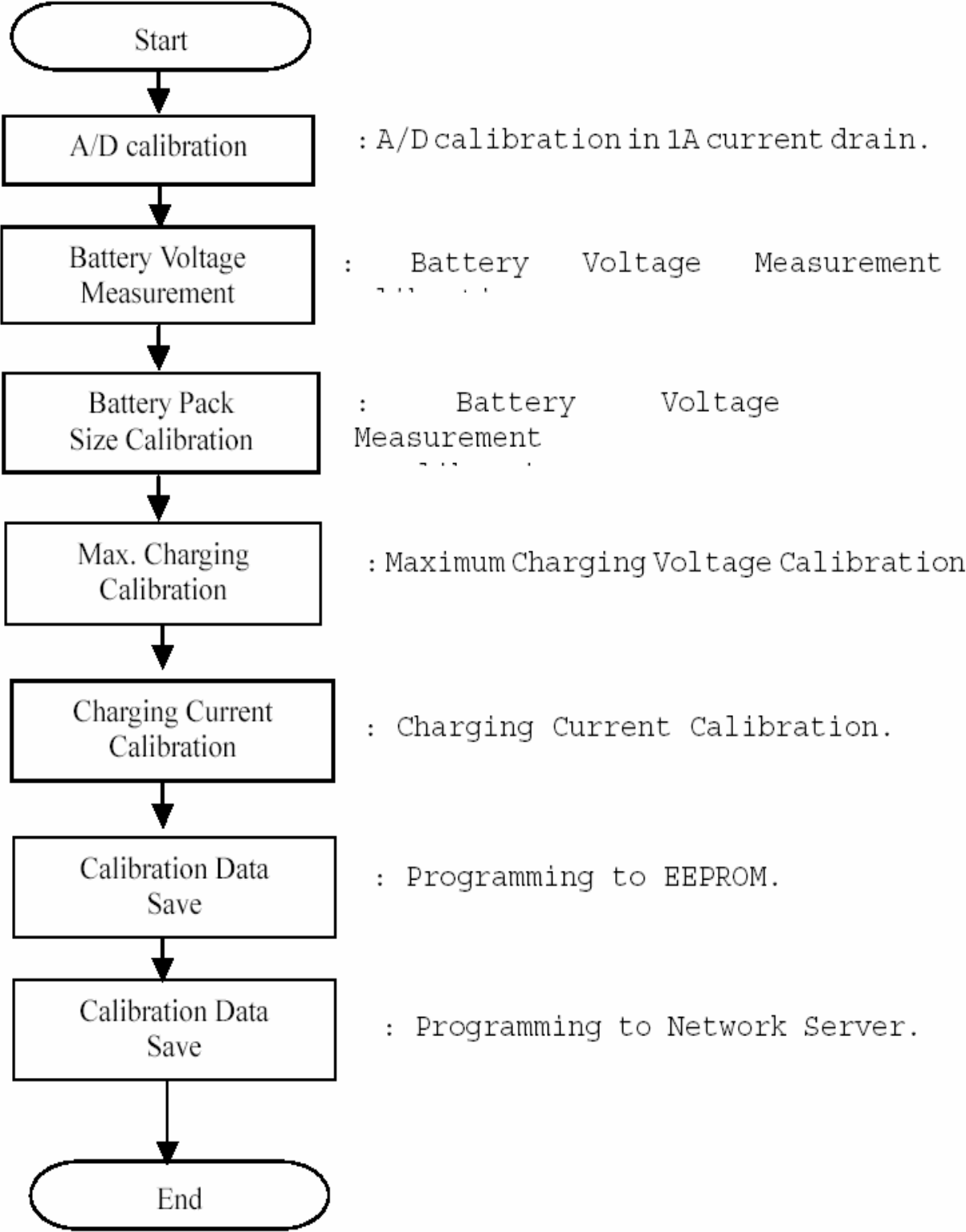


Figure 3-2. Battery Calibration - Flow Chart