4 - Service Tools

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Service Tools

Supported Operating Systems

Windows 98, 2000, ME and NT 4.0 (SP4).

Hardware requirements

Minimum: Processor 233 MHz, RAM memory 64 MB, Disk space 50-100 MB.
Recommended for Windows 2000:
Processor 700 MHz, RAM memory 512 MB, Disk space 50-100 MB.

List of service tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RH-4, refer to various set-ups.

Type designator	Description	Part code
CPL-10	RF Coupler 900-1900	0770548
FLA-30	POS flash adapter	0770472
PCS-1	DC power cable	0730012
SCB-3	DC cable	0730114
XCS-1	Service cable	0730218
XCS-4	Modular cable	0730178
XRC-1b	RF antenna cable	0730128
XRC-2	RF test cable N type connector	0730180
FLS-4S	POS flash dongle for E/A area POS flash dongle for APAC area POS flash dongle for Americas area	0080541 0080542 0080543
FPS-8	Parallel flash prommer (inc. AXS-4, AXS-8, universal power supply)	0080321
	Printer cable (inc. in FSP-8 sales pack)	0730029
FPS-8C	Flash prommer box	0080396
	Phoenix Service SW Phoenix Service SW in CD-ROM	8410533 0775322
JBV-1	Docking station	0770298
MJF-17	Docking station adapter	0774282
MJ-7	Service jig	0770518
RJ-6	Repair solder jig	0770519
LRK-2	LGA repair kit 1	0273645
LRK-3	LGA repair kit 2	0273646
SS-6	Keyboard flip disassembly tool	0770675
SRT-6	Opening tool	0770431

Introduction

This document describes the service tools used to test, tune and calibrate the RH-4 phone. For user instructions and procedures please refer to Chapter 3 of this service manual.

Service tools

Service Software

The service software used by Customer Care for DCT4 phones is called Phoenix, The Phoenix service software requires 32 bit operating systems and are not compatible with Windows versions 3.X. For installation and user instructions please refer to Chapter 3 of this service manual.

Docking Station JBV-1 0770298

The docking station concept is to make a service box common tool for DCT4 generation. It is used for calibration, flashing and for functional tests. It consists of basic frame and phone specific adapter. Basic frame includes electronic part and every connections to the service environment. It is a common environment for all DCT4 products.

JBV-1 (reused)	DCT-4 docking station

Docking Station Adapter MJF-17(0774282)

Introduction

Specific products are contacted using JBV-1 and product specific adapters. RH-4 uses the same Docking Station Adapter as the NPL-2 phone.

RH-4 does not provide means of galvanic RF connection. In order to perform RF testing MJF-17 provides an antenna coupler. This enables RF testing but not RF tuning and RF alignment.

MJF-17 Docking Station Adapter

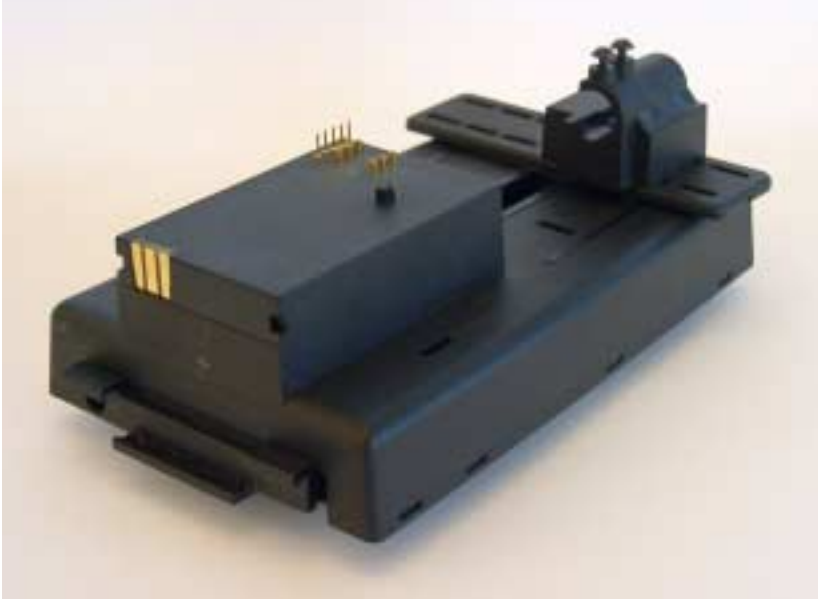
Docking Station Adapter for assembled RH-4 phones. MJF-17 supports testing, flashing, energy management calibration.

If used in conjunction with CPL-10, also RF function testing is possible.

Features include:

- compatible for JBV-1
- easy phone attachment and detachment
- reliable phone locking
- switch for reliable detection of phone attachment
- replaceable test pins
- internal SIM holder with interface to phone SIM reader

View of MJF-17



CPL-10 RF Antenna Coupler for use with MJF-17 (0770548)

Extends MJF-17 to allow RF function tests in GSM bands 900, 1800 and 1900 MHz.

Features include:

- easy attachment to MJF-17 without use of tools
- reliable RF connection to phone module under test
- low attenuation and small "ripple" over the width of each GSM band

View of CPL-10

MJ-7 Module Jig (0770518)

Introduction

A module jig is used to hold the engine PWB when covers, display assembly (=display and keymat) are removed and component level analysis and troubleshooting is done.

Users of this module jig are R&D, production and service. Material for jig-mechanics is semi-conductive material and offers ESD protection.

Features of MJ-7

MJ-7 is a stable and robust jig targetted for analysis and repair of pot. broken RH-4 system modules. Most needed electrical connections are made on one side of the jig and easily allow turning over.

MJ-7 mechanics follow a folder concept. Having opened the "folder", insertion of a phone system module is possible, closing establishes a set of electrical connections that support product testing.

System module insertion and proper alignment are supported using special alignment pins. These and the overall jig design ensure that wrong or unprecise system module insertion or even damage are quite unlikely.

System Module Operation

MJ-7 allows to operate the system module of a disassembled RH-4 phone in a way as close to assembled phone operation as possible (except RF).

The whole jig and the inserted module are supplied with power from an external adjustable power source. It is made sure that wrong polarity will not cause any harm to the jig and phone PCB. In addition, there is a fuse as short-cut protection.

Power supply to the phone is acheived using special tests pads that are equivalent to power supply via battery contacts. Connection of external power supply is achieved by means of the established DC jack connector.

Regarding battery size identification (BSI), the jig simulates a standard phone battery.

Regarding SIM connections, the jig includes a separate standard SIM-reader that is connected to the system module after being inserted.

Display output is visible on the jig display. Key input is possible using the mounted jig flip. Touchpad input is available through the touchpad mounted on the jig. The display, flip and touchpad are permanent parts of MJ-7 which are not exchanged while changing the system module under tests. However, in case of defect it is possible to exchange or service the display, flip and touchpad module.

Proper power supply of the jig can be recognized using the assembled "power" LED. FBUS/MBUS activity is displayed on the jig using two additional separate LED's:

System module is connected to speakers ear and handsfree speaker and microphone, as would be the case in an assembled phone. This allows to perform full audio go-no go tests with MJ-7.

Connection of Tomahawk accessories (such as charger and external headset) to the system module under test are possible.

External RF antenna connection and phone alignment with minimal insertion and transmission loss is possible using an SMA connector.

System Module Diagnosis

Inserted system modules can be operated as normal phone, as described in section (System Module Operation)

In addition, MJ-7 automatically establishes a connections to test pads required for phone diagnosis, flashing and IMEI programming. These features can be utilized using service SW Phoenix.

It is supported to bypass any power supply protection circuitry in order to allow power consumption measurements of the phone (=system module with connected display, speakers, microphone and vibrator). Means for bypassing is a mechanically protected jumper.

Access to a ground pins as voltage reference is possible from both sides of the jig.

Special Operation Modes

MJ-7 supports IMEI programming and fast flashing modes.

MJ-7 offers a switch to select between *normal* and *local* phone operation mode. This mode selection is achieved by adding special resistor values to the BSI connection of the phone.

Component Access and Repair

It is still possible to access nearly all assembled components of a system module after module insertion into MJ-7.

However, due to design and test access constraints it may not be possible to perform all kinds of component repairs while the system module is being held inside the jig.

View of MJ-7

Power supply features

- jig and phone power supply via 3mm DC jack, fuse
- power stabilization and voltage regulator on jig (can be bypassed by jumper)
- reverse and over-voltage protection of jig and phone module

Communication and status LED's

- green: Power supply
- green: MBUS activity
- orange: FBUS activity

Usage Hints

- **before first use** verify setting of power supply jumper on the rear (=bottom PCB) of the jig; if power supply is >4.2 V, make sure jumper enables power regulation of the jig in order to prevent overvoltage for the phone module under test and the jig

RJ-6 (0770519)

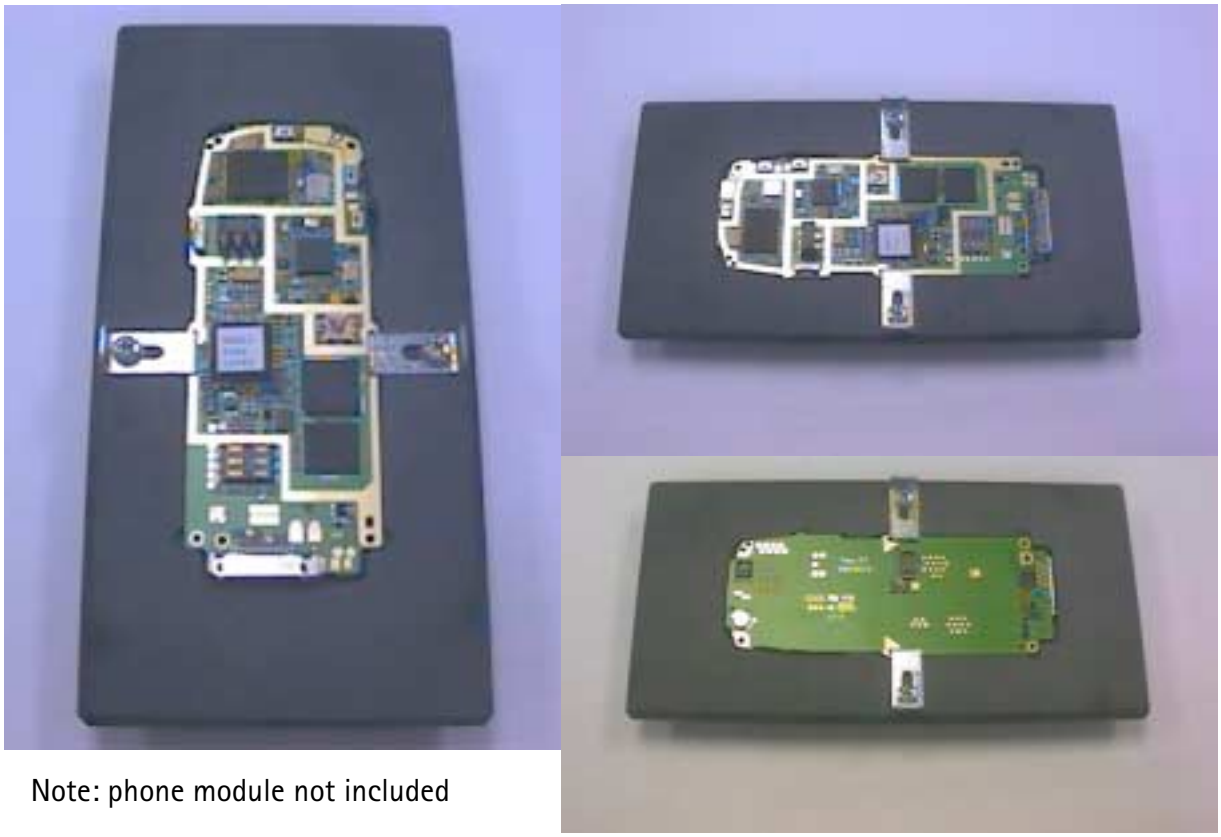
Soldering Jig is used for module level repair, either as fixation in µBGA rework places or when there is need to hold a module on the work bench for any other repair.

Features include:

- one hand phone module insertion
- convenient locking mechanism

- four (optional mount) rubber feet allow usage also on repair benches
- fixation of phone module in both ways possible (bottom or top side up)
- ESD proof material
- standard uBGA jig thickness and outer dimensions

Views of RJ-6



Note: phone module not included

Flash Tools

For flashing there are the following use cases for RH-4:

Type	Description	Design target
POS flash adapter, FLA-30	used at points of sales for easy-to-use SW updates; does not support any tunings or alignments; reuse of FLS-4 uses **FLA-30**	cheap
docking station adapter, MJF-17	used during and after repair and service; supports flashing, tuning and alignment. reuse of JBV-1 docking station reuse of FPS-8 uses **MJF-17**	durable, reliable

Type	Description	Design target
Test and service-jig MJ-7	allows flashing while phone is disassembled reuse of FPS-8 uses **MJ-7**	optimum diagnosis and component-level access

POS Flash Adapter

Under the phone SIM card there is a test pattern that is also used for flashing in MJ-7 environment and when using MJF-17.

FLA-30 establishes a simple environment for SW update purposes and connects to the same flash test pattern and the phone battery contacts. When using FLA-30 the phone SIM card must be removed and the SIM flap has to be OPEN.

FLA-30 NMP 0770472 RH-4 POS flashing adapter (reuse from NPL-2)

FLA-30 Point of sales flash adapter for RH-4 phones (0770472)

Features include:

- flashing and testing of the attached phone
- overvoltage and reverse polarity protection of adapter and attached phone
- green LED: power supply valid and attached to the phone (3.5V<Vcc<7V)
- red LED: overvoltage condition, phone power supply disconnected (Vcc>7V)
- shielded 10-pin Western connector towards flash equipment or PC
- 3mm DC-jack for phone and adapter power supply
- phone battery contacts (VCC, GND, BSI)
- flash test pattern pins

View of FLA-30

Spare Parts

There are no serviceable parts inside FLA-30, and FLA-30 is not designed for disassembly. Only serviceable part are the spring loaded test pins that can be replaced without soldering and disassembly. Used test pin type is SX-1-J-2.0-G from manufacturer IDI.

Bent pins can be extracted from adapter's receptacle using a tool. Torn off pins can be replaced using a slowly spinning 0.8 mm. For more detail, please refer to the Service Tool Troubleshooting section.

Test pins (10pcs / plastic bag) NMP 0770450

Flash box FPS-8(C) NMP 0080321

Flash Adapter FPS-8 is the common basic flashing solution for DCT4 products. Heavy Flash FPS-8C is designed for use in bigger service centers.

The heavy flash solution is one box including functionality of several Flash Prommers, Security Boxes and Flash Loading Adapters. Phones can be connected to FPS-8 via POS Flash Adapter or via docking station with the right adapter.

FPS-8 (reuse)	NMP 0080321	Reuse of standard flash box
FPS-8C (reuse)	NMP 0080396	Reuse of heavy flash solution

Service Cables

Existing cables will be used as much as possible. If/when designing new cables, old cables and connectors must use as reference to have easy connectivity to measurement environment in services.

Service MBUS Cable DAU-9S 0730108

Cable between service box and PC

Service Cable (POS flash cable) XCS-1 0730218

Between FLA-30 and FLS-4.

Service Cable e.g. XCS-4 0730178

Cable between service box and FPS-8. Included to FPS-8 sales packet.

Power Supply Cable PCS-1 0730012

Power cable to the service box and module jig

Service Battery Cable SCB-3 0730114

Cable between phone and service box for charger calibration.

Keyboard Flip Disassembly Tool SS-6 0770675

To be able to remove the keyboard flip from the A-cover, a special designed tool is required. For disassembly instructions please refer to Chapter 5 of this service manual.

Caution: Care should be used when handling this tool, as the tip is only 0.7 mm in diameter. When not in use store in a safe location.

View of SS-6 Keyboard Flip Disassembly Tool