ACTiSYS Corp.
48511 Warm Springs Blvd., Suite 206, Fremont, CA 94539 Tel: (510)490-8024,
Fax: (510)623-7268, Website: http:\\www.actisys.com, E-mail: actisys@actisys.com

IrFM Fast Connect Development/Test Suite

(ACT-IR303FM, v0.1.5-030109)

January 09, 2003

IrFM Fast Connect Development/Test Suite
(ACT-IR303FM, v0.1.5-030109)

Revision History

Revision	Date	Comment
Rev. 0.1.0	11/25/2002	Updated contents
Rev. 0.1.1	12/03/2002	Updated model #s
Rev. 0.1.2	12/23/2002	Added Fast Connect/IrOBEX/IrFM block diagram in Sec. D
Rev. 0.1.3	12/24/2002	Added IrFM Implementation Strategy in Sec. E
Rev. 0.1.4	12/25/2002	Editorial changes; Added IR103SLi/IR8203LM5VP photo in Sec.E-2
Rev. 0.1.5	01/08/2003	Moved Rev. History to page #2; Updated model name, IR8200LA-M

ACTiSYS reserves the right to make changes without further notice to any products herein to improve reliability, function or design. ACTiSYS does not assume any liability arising out of the application or use of any product or circuit described herein.

IrFM Fast Connect Development/Test Suite
(ACT-IR303FM, v0.1.5-030109)

Table of Contents

ACTiSYS Corp.
48511 Warm Springs Blvd., Suite 206, Fremont, CA 94539 Tel: (510)490-8024,
Fax: (510)623-7268, Website: http:\\www.actisys.com, E-mail: actisys@actisys.com

IrFM Fast Connect Development/Test Suite (ACT-IR303FM, v0.1.5-030109)

A) The ACT-IR303FM Suite

"IrFM Fast Connect Development Suite" is a set of hardware/software designed to test and debug Fast Connect for IrFM PTD and/or POS under development.

B) Benefits of ACT-IR303FM Suite

1) Facilitates testing and debugging of Fast Connect for IrFM PTD and/or POS.
2) Promotes inter-operability of Fast Connect for IrFM PTD and POS.
3) Speeds up the IrDA certification process.
4) Speeds up time to market.

C) Hardware/Software Included in the Suite

1) IrFM PTD Fast Connect Simulator Hardware (IR203L) and SW (ACTiLinkPTD).
2) IrFM POS Fast Connect Simulator Hardware (IR223L) and SW (ACTiLinkPOS).
3) Fast Connect Recording Hardware (IR910D) and Software (IR912SW).
4) Fast Connect Recording Analyzer Software (IR913SW).

C-1) IrFM PTD Fast Connect Simulator (ACTiLinkPTD and IR203L)

1) This program runs in a PC (not included) and uses a special IrDA dongle (IR203L, included in this Suite) to simulate different kinds of IrFM PTD performing Fast Connect.
2) Under software control, the simulated PTD (Personal Trusted Device, e.g. cellphone, PDA, e-wallet) can use either standard power or low power IrPHY.
3) Under software control, the simulated PTD can use either 1.6 usec or 3/16 bit-time IR pulses.
4) Under software control, the simulated PTD can use either 0xFF or 0xC0 as XBOF when needed.

5) Under software control, the simulated PTD responds to XID from POS with either XID at 9.6 kb/s, XID at 115.2 kb/s, or UA at 115.2 kb/s. (These are the three options defined in Fast Connect.)

C-2) IrFM POS Fast Connect Simulator (ACTiLinkPOS and IR223L)

1) This program runs in a PC (not included) and uses a special IrDA dongle (IR223L, included in this Suite) to simulate IrFM POS Fast Connect.
2) The visiting PTD can use either standard power or low power IrPHY.
3) The visiting PTD can use either 1.6 usec or 3/16 bit-time IR pulses.
4) The visiting PTD can use either 0xFF or 0xC0 as XBOF when needed.
5) The visiting PTD can respond with either XID at 9.6 kb/s, XID at 115.2 kb/s, or UA at 115.2 kb/s. (These are the three options defined in Fast Connect.) This simulated POS can auto-detect the data rate and perform Fast Connect accordingly.
6) Under software control, this simulated POS can vary its 1-slot XID polling period between 55 msec and 300 msec as specified in Fast Connect.

C-3) Fast Connect Recording Program (ACT-IR912SW and IR910D)

1) This program runs in a PC (not included) and records the conversation between PTD and POS at data rates of 9.6, 19.2, 38.4, 57.6, or 115.2 kb/s. (It changes data rate automatically to follow the conversation.)
2) This program uses a special IrDA dongle (ACT-IR910D, Dual-Head IR220L+, included in this Suite) to receive from both the PTD and POS. It never transmits.
3) If there is a collision or if there is IR interference, this program will record an error. The corrupted IR data from either the PTD or POS are lost.
4) This program is aware of the rules specified in IrDA Fast Connection and IrLAP Negotiation Procedures. It will automatically change the data rate of its receivers according to these rules and correctly follow the conversation between the PTD and POS. But if the PTD or POS changes data rate not according to these rules, this program may not be able to follow the conversation after that point.
5) Every byte of IR received is time-stamped and recorded in a binary file.

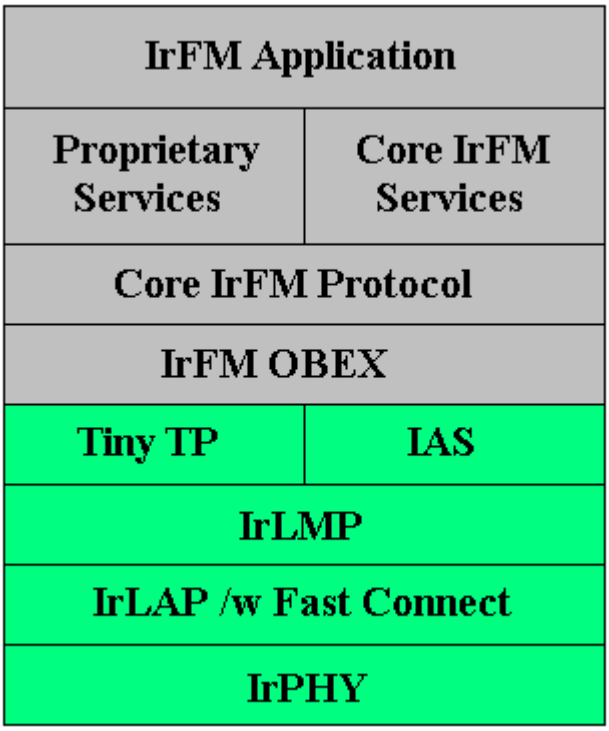
C-4) Fast Connect Recording Analyzer (ACT-IR913SW)

1) This program reads the binary file generated by the Recording Program and transcribes the information into three ASCII text files.
2) The first text file has all the details at the IrPHY level. It shows all the IR bytes received, including IR-noise, XBOF, BOF, byte stuffing, CRC, EOF, etc. It organizes these bytes into IrPHY frames whenever possible. It also includes timing information in msec with 0.1 msec resolution to show inter-frame gaps, inter-byte gaps inside the frame if any, and total transmission time of each frame. CRC is also checked at this level.

3) The second text file has only the details at the IrLAP level. The timing information and frame wrapper are stripped. Proper sequencing of Nr and Ns are checked at this level.
4) The third text file has only the details at the IrLMP level. That is, only the payload of IrLAP I-frame is shown. This includes the IrLMP Destination, IrLMP Source, TinyTP and all upper layer data.
5) All frames in the above 3 text files are assigned arbitrary but unique sequential numbers for easy cross-referencing between these 3 text files.

D) IrLAP Fast Connect, IrFM Block Diagram

ACT-IR303FM only addresses IrPHY+IrLAP with Fast Connect+IrLMP+TinyTP+ IAS+IrFM OBEX Transport (the green color section in diagram shown below).
It does not address the other IrFM protocol layers, which must be a part of the host system application software: IrFM OBEX/Core IrFM Protocol/Proprietary Services/ Core IrFM Services/IrFM Application (the gray color section in diagram below).



E) IrFM Implementation Strategy

For IrFM implementation in POS system, there are two approaches:

E-1) IrFM Implementation Plan 1 – Port Full IrDA and IrFM Protocol Layers

1) Port the full IrDA and IrFM protocol layers onto the POS microprocessor.
2) POS manufacturer needs to port and integrate these IrDA protocol layers properly with POS host system software.
3) POS manufacturer needs to test for compliance with IrDA and IrFM spec.
4) POS manufacturer needs to implement properly IrDA and Fast Connect physical components (transceiver, encode/decode IC) and PCB layout.
5) In case of IrFM or IrOBEX correction or updates, POS manufacturer may need to re-do (1) - (3) above, again, each time to meet IrReady spec.
6) IrLAP with Fast Connect may not be optimized to perform fast enough connection.

E-2) IrFM Implementation Plan 2 – Partition IrFM from IrDA Protocol and IrPHY

1) Port IrFM and IrOBEX protocol layers onto the POS microprocessor.
2) Use ready made and pre-tested IrDA/FastConnect internal PCB or chip set, which includes IrDA core protocol layers and IrDA Physical (with Fast Connect).
3) IrFM POS system is easier and quicker to pass IrReady certification tests.
4) In case of IrFM or IrOBEX correction or updates, POS manufacturer needs not to touch the performance and IrReady sensitive IrDA/FastConnect module.
5) Much faster to pass IrReady certification tests, and time to market, even after each application revision.
6) An example of such ready made/pre-tested IrDA/FastConnect internal PCB, ACTiSYS ACT-IR103SLi (uses chip set: ACT-IR8203LM5VP) is shown below:

F) IrLAP Fast Connect, IrFM Profile, and IrDA Protocol Documents

F-1) IrLAP Fast Connect Spec.

"IrLAP Fast Connect (Application Note), Version 1.0", IrDA, Nov. 2002

F-2) IrFM Profile Spec. IrFM Test Spec.

"IrFM Point and Pay Profile, Version 1.0", IrDA, Dec. 2002
"IrFM Test Specification, Version 1.0", IrDA, Dec. 2002
"IrFM OBEX Test Specification, Version 1.0", IrDA, Dec. 2002

F-3) IrDA Protocol Spec.

"Serial Infrared Link Access Protocol, IrLAP, Version 1.1", IrDA, Jun. 1996
"Link Management Protocol, IrLMP, Version 1.1", IrDA, Jan. 1996
"Tiny TP, Version 1.1", IrDA, Oct. 1996
"Object Exchange Protocol, IrOBEX, Version 1.2", IrDA, Mar. 1999

F-4) IrDA Protocol/FastConnect and IrPHY Module (ACT-IR8203LM) Spec.

ACTiSYS ACT-IR8203LM / IR103SLi Product Spec., ACTiSYS Corp., Feb. 2003
"Serial Infrared Physical Layer Link Spec, IrPHY, Ver. 1.3", IrDA, Oct. 1998

