SWLN01 : Wireless Module User Manual

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Version: 1.0

Visual Display Division
Samsung Electronics.Co.Ltd

1 Overview

1.1 Purpose

The SWLN01 platform will be used by Samsung Visual Display division to develop their 3 generation wireless TV solution.

2 Hardware Requirements

2.1 Connector requirements

The base board contains the miniPCI host connector. The UART signals are routed via the miniPCI connector.

The concept is shown in Figure 1

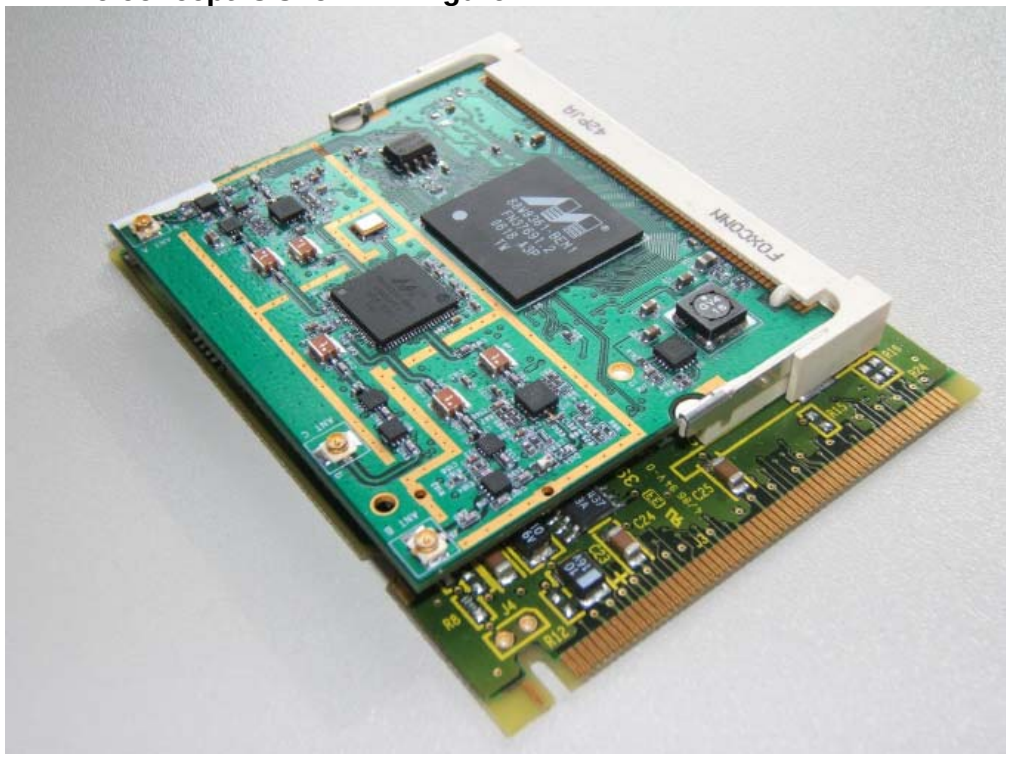
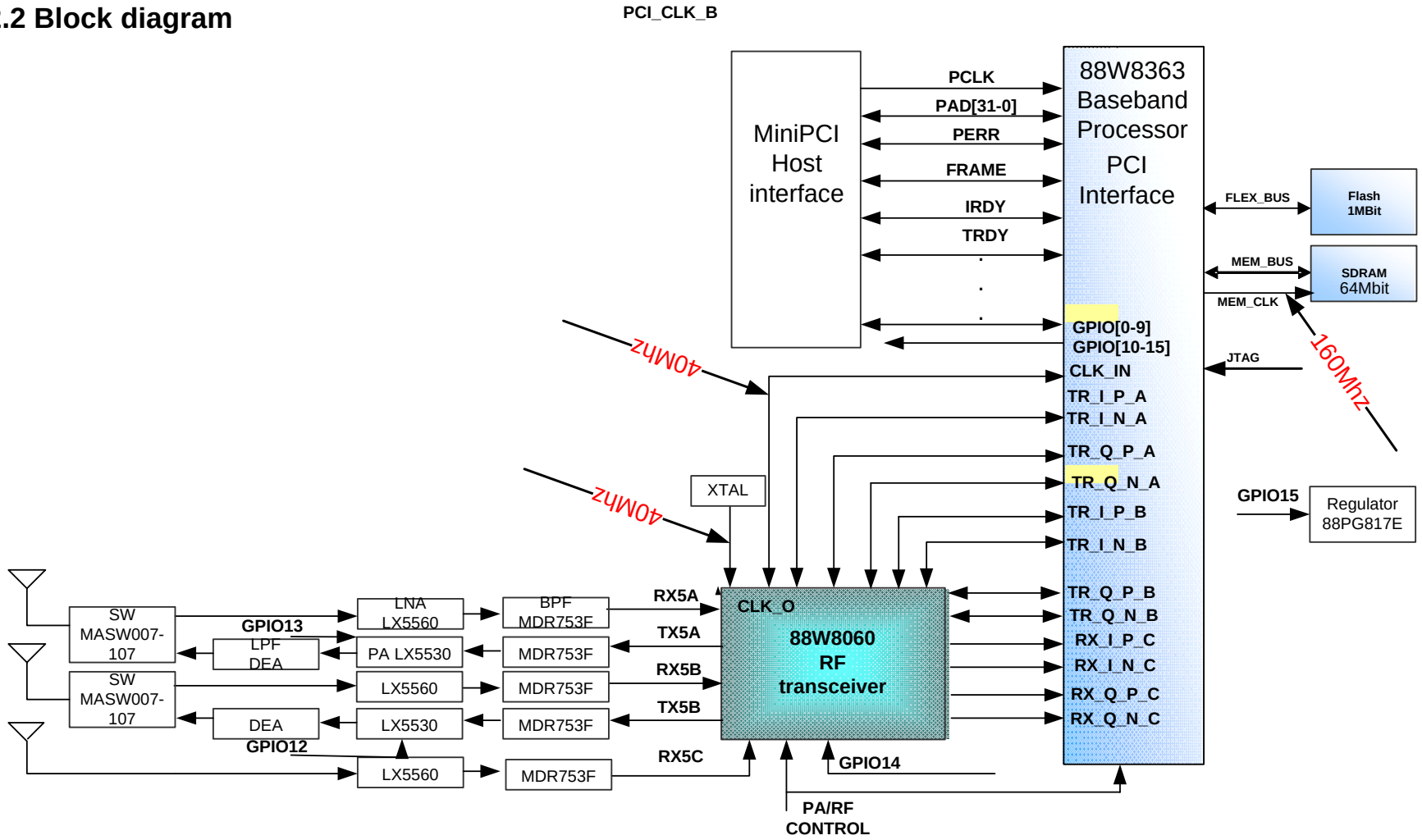


Figure 1

2.2 Block diagram



The 88W8363 has connected to it an 8MB SDRAM for data storage and if necessary some code. The 8363 device is also connected to a Flash which stores the code.

The Baseboard mPCI host connector will be a physical mPCI connector but the logical pins shall not be mPCI complaint.

2.3 RF Requirements (including system performance)

The Card should achieve good range performance at the specified operating points (in terms of data rate). The operating points of interest are

1. **75 Mbps MPEG TS throughput using 40MHz bandwidth**
2. **50m outdoor / 75 Mbps throughput using 40MHz bandwidth**

No.	Description	Value
1	Frequency bands	4.9-5.1GHz (optional) 5.15-5.25 GHz 5.25 - 5.35GHz 5.35 – 5.725 GHz 5.725-5.825GHz
2	Output power per antenna	
2.1	16 QAM (MCS 11, 12, 3, 4)	+18dBm (5.725 – 5.825) + 16dBm (5.15-5.25)
2.2	QPSK (MCS 8, 9, 10, 0, 1, 2)	+18dBm (5.725 – 5.825) + 16dBm (5.15-5.25)
3	Antennas	External with U.FL connectors on board
4	LNA	External required
5	Sensitivity	
5.1	MCS 4 @ 20MHz, 800ns GI	-84dBm
5.2	MCS 4 @ 40MHz, 800ns GI	-80dBm
6	Power consumption	No constraints

3 Software requirements

3.1 Description

SWLN01 is a stand alone wireless client; it does not have any drivers on the host. The card is expected to boot-up automatically and function on it own.

The only control interface is through the UART. The number of controls to the wireless UART interface: Essentially an end-to-end control interface. The commands that come-in to the wireless card are expected to be sent over the air to a similar card on the other side where the commands are sent out through the UART. A very few commands (such as initialize) are meant for the card itself.

3.2 Operating mode

A pair of cards will operate as a point-to-point link. Ad-hoc mode of operation is adequate. It will be ideal to designate one card as master (lite AP) and the other as a client. The master will be the one that transmits the beacon.

3.3 UART Interface

The UART Interface should support

1. **115,200 bps baud rate**
2. **RTS-CTS disabled**
3. **8-N-1, No flow control**

The packet transmission should be in Big-Endean format.

3.4 Security

SWLN01 should support AES-CCMP encryption similar to IEEE 802.11i standard. All MPEG TS packets received over the TS interface should be encrypted with the security key. Encrypted packets should be decrypted by the receiver.

The security keys will be negotiated between host processors. The encrypted security keys will be passed to SWLN01 through UART commands. The encrypted security key will be decrypted by SWLN01 using AES. Periodic re-key negotiation will be done by host processor and keys plumbed down to SWLN01 over UART interface.

3.5 Channel configuration

The master should implement some form of automatic channel selection upon power up. The cleanest channel should be chosen in order to ensure good operation.

3.6 Dynamic Channel Selection

If interference is detected, both the master and client should move to a cleaner channel. This switch should be done with limited video quality loss. The total time from the arrival of interference in the channel to transmission of video on a different channel should be less than 500ms.

3.7 DFS Requirements

DFS is not required in the US when operating in the 5.15-5.25 GHz and the 5.725-5.825 GHz frequencies. The SWLN01 platform will operate only in these frequencies.

3.8 Video streaming

The master will receive the MPEG TS packets through the TS interface. These packets are expected to aggregated, encrypted and transferred over the air to the client device. In the client the packets are decrypted, de-aggregated and sent out through the TS interface.
The TS packets should be sent using the highest priority.
A near-isochronous link should be mimicked between the TS_IN and TS_OUT. The jitter should be in order of few milliseconds.
The end-to-end latency from TS_IN to TS_OUT should be in order of few 10s of milliseconds.

3.9 Quality of service

Two classes of traffic need to be transferred over this wireless link. The video class will use the highest priority. The data on the UART should be transferred as best-effort.

3.10 Software requirements table

No	Requirement
General Requirements	
1	Boot requirements: The card should be able to boot from serial EEPROM.
2	EEPROM programming: The EEPROM should be upgradeable through the JTAG.
3	Fixed configuration point to point link. Each pair can be hardwired in terms of MAC address and association pair.
	One member of the pair can be identified as the Master (pseudo AP) and the other the Client (STA).
4	ACS: The setup should have a primitive form of CS, the Master will search for a clean channel and send out beacons, the client can then associate with the Master.
5	DCS: In case of interference in the channel, the master and client should switch to a new channel in less than 100ms.
5	UART based command and control: Commands will be sent to/from the UART. The majority of these commands will need to be transferred over wireless. The only command that need to be processed locally is a RESET command (The exact details will be provided by Samsung).
802.11n requirements	
5	Should be able to operate in 40Mhz modes
6	Should be able to operate at MCS 12 and below for 2 spatial streams and MCS 4 and below for 1 spatial stream
7	Rate control optimized for 40Mbps and 80[1] Mbps streams

3.11 Compliance Testing

FCC Part 15 certification will be required for **SWLN01** platform.

3.12 Temperature Range

The **SWLN01** platform will operate from 0-70C.

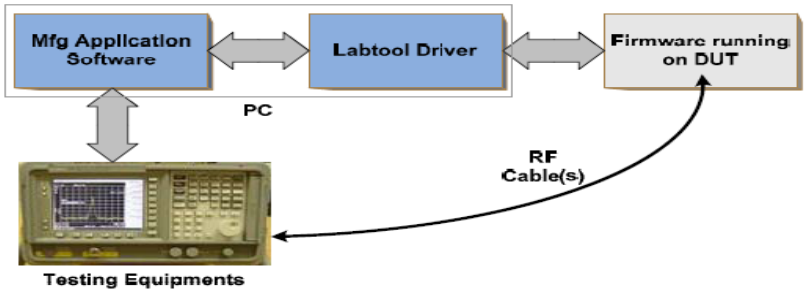
4 . Rest Specification

Refer to 88W8060 & 88WW8363 PDF Files

Adobe Acrobat 7.0 Document Adobe Acrobat 7.0 Document

5. Manufacturing Setup

- **Manufacturing (Mfg) tools provide lower level access to the basic functions of the WLAN chips**
- **Mainly used for calibration and basic performance testing**
- **Mfg tools are composed of a few components**
  - **Mfg firmware**
  - **Labtooldriver**
  - **Mfg application software**
  - **Testing equipments**



6. FCC information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any Interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operated in conjunction with any other antenna or transmitter.

The final device into which this transmitter module is installed must be labeled with the following statement:

"This device contains TX FCC ID: A3LSWLN01." If this transmitter will be configured as a pc peripheral, it will be the OEM's responsibility to obtain authorization as such (either through Certification of Declaration of Conformity) prior to marketing of the device. "

Within the 5.15-5.25 GHz band, this device will be restricted to indoor operations to reduce Any potential for harmful interference to co-channel MSS operations.

HOW TO ASSEMBLE A3LSWLN01 MODULE

1. This is A3LSWLN01 Module

2. There is Wireless Module Socket on the PDP B'd

3. A3LSWLN01 to be inserted about 45 degree.

4. After insert completely, Antenna to be connected

Warning:

In order to comply with FCC RFx requirements, the EUT must be installed such that a minimum separation distance of 20 cm is maintained between the antennas and all persons during normal use.