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The technical content of this austriamicrosystems application note is still valid.

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AS3900 Demo Board Manual

AS3900

27MHz Low Power FSK Transceiver

www.austriamicrosystems.com

General Description

Board Description

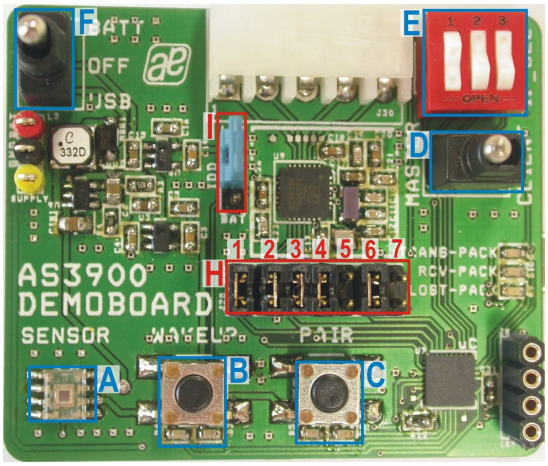


Figure 1: Board Description Top – User Interface

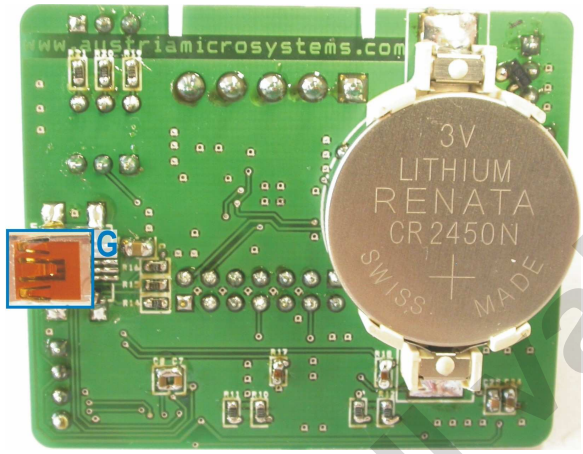


Figure 2: Board Description Bottom – Connectors

User Interface Description

Label	Name	Description	Info
A	**SENSOR**	Brightness Sensor	Data of the brightness-sensor is transmitted from the client to the master over the HF-Interface
B	**WAKEUP**	Wakeup – Button	Initiates wakeup to start/stop communication
C	**PAIR**	Pair – Button	Initiates pairing-procedure to establish network
D	**MASTER/CLIENT**	Master/Client – Selection Switch	Selects board to operate as master or client
E	**ID SELECTION**	Dip Switch for ID Selection	Select an unique ID for each client
F	**POWER**	ON/OFF Switch	Power on/off the Demoboard. Select the Source (Battery or USB)
G	**USB – Connector**	Mini USB 5-pin Connector	Supplies the AS3900 with 5V. Connect Master to a standard USB port.

Note: The Master-Demoboard should be connected via USB to a standard USB port. Supply the Master from the USB-Interface. Supply the Clients from the 3V Battery.

Indication LEDs

LEDs	Blinking Colour	MASTER	CLIENT
PAIR	Red LED	Master is collecting IDs of existing Clients	Client is prepared to be added to network
	Green LED	Master established a network with at least one client	Indicates a paired client. ID of Client was exchanged with Master
WAKEUP	Red LED	Master sends wakeup sequence to Clients	Client is prepared for transmitting sensor data
	Green LED	Master awoke at least one Client and exchanges data	Client is woken up and transmits data
TRANS-PACK	Green LED	Data packages are transmitted	
RCV-PACK	Orange LED	Data packages are received	
LOST-PACK	Red LED	Data packages are lost	

Jumper Description

Jumper	Name	Description	Info
I	**IDD**	Supply Current	Supply Source of AS3900 can be selected between constant 3.1V (LDO) and variable battery voltage (BAT). The supply current of the AS3900 can be measured.
H		Microcontroller - Interface	The SDI –Interface from the microcontroller can be replaced by an proprietary solution
	H1	SDATAI	Serial Digital Interface DATA Input
	H2	SCLK	Serial Digital Interface Clock
	H3	SEN	Serial Digital Interface Enable
	H4	SDATAO	Serial Digital Interface DATA Output
	H5	MCU_CLK	Microcontroller Clock Output
	H6	IRQ	External Interrupt for Microcontroller
	H7	POR	Power On Reset Output

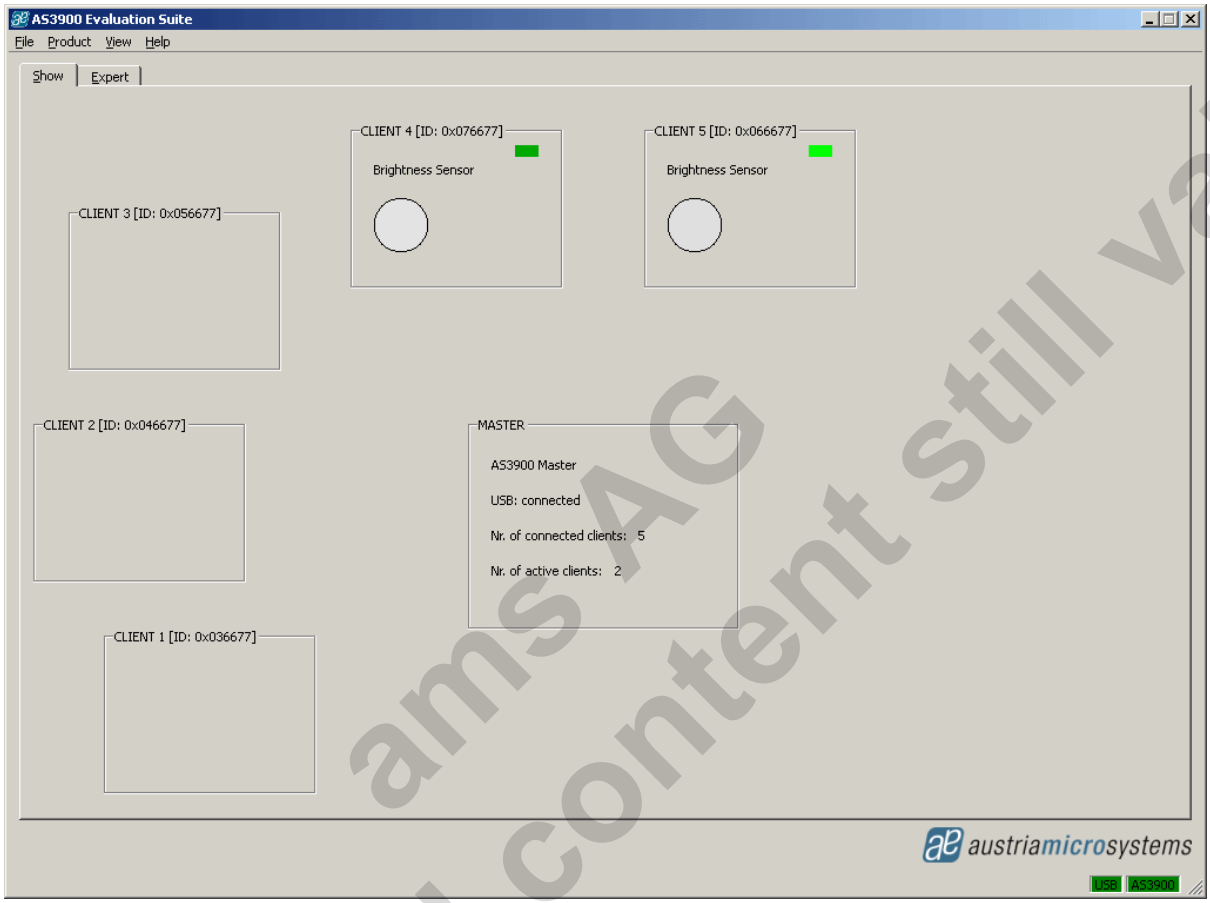
How to easily get started with the AS3900 demo kit?

- Allocate 1 board as Master and 1-8 boards as Client via switch **"D"**.
- Select for each Client a unique ID via the dip switches **"E"**.
- Connect the Master to the PC via the provided USB Cable on **"G"** and start the GUI.
- Turn on all board. For the Master turn the ON/OFF – switch **"F"** to USB. For the Client turn the switch **"F"** to BATT. If the Master is not connected to the PC, supply the board from battery also. When turning on the boards all indication-LEDs flash up once.
- Press the PAIR – button **"C"** at all Clients, in order to prepare the Clients for the pairing procedure. The PAIR led is blinking red.
- Press the PAIR –button **"C"** at the Master. All Clients will get visible on the GUI. All PAIR - LEDs are blinking green.
- Press the WAKEUP – button **"B"** at all Clients, in order to prepare the Clients for the data transmission.
- Press the WAKEUP – button **"B"** at the Master to start the communication. All light sensors get visible at the GUI. All WAKEUP - LEDs are blinking green.
- Darken the light sensor **"A"** at the Clients. The current brightness of the sensor is visualized on the GUI.

Install the GUI:

1. Execute the AS39xxx_EvalSW.msi
2. Follow the installation guide
3. Run the GUI → AS39XX_EvalSW.exe

Note: If the Master is correctly connected, the USB field in the lower left corner is green. Afterwards the GUI is ready to run the following procedure to establish the network.



How to execute a Firmware Update:

1. Connect AS3900 Demoboard with the PC and turn on the board (Set switch **"F"** to USB)
2. Go to Help → Firmware Update (Ctrl + F)
3. Select and load latest Hardware (*.bin – File)

Note: After a Firmware Update it is recommended to restore the default settings from flash, in order to get a working setup. Go to the Expert Mode and press the button **"restore default settings"**.

Operational sequence

This demo board comes with one antenna, one 3V battery and one USB-cable.

Prepare the Hardware

1. Drive the IC on the demo board only with the recommended settings and values as described in the datasheet. If not present get the datasheet for the AS3900 from www.austriamicrtosystem.com.
2. First connect the power supply via connector **"G"** to a powered USB port or insert the provided 3V battery. Power on the Demoboard by turning the switch **"F"** to USB or BATT. The Master is recommended to be supplied from USB. The Client is supplied from the 3V battery. To power down the system turn the switch **"F"** into its middle position (OFF).
3. Select one Demoboard as Master and at lease one Demoboard as Client at Switch **"D"**. Make sure not to have more than one Master.
4. Select for each Client a unique ID via the Dip Switches **"E"**. Make sure not to have Clients with the same ID.

PAIR the Clients to the Master

1. Press the "PAIR" Button **"C"** at all Clients. The "PAIR" Button is blinking red.
2. Press the "PAIR" Button **"C"** at the Master. The Master starts the communication and the Clients send their IDs. If the Master gets valid IDs the PAIR LED switch from blinking red to blinking green. This mean, that the Master has recognized at least one Client for the network. After a handshake the Clients start to blink green as well.
3. If not all Clients are paired at the first time, press the "PAIR" button at the master again, until all Clients are blinking green.
4. The GUI at the Master shows all valid Clients with their appropriate address. (Dip Switch + 1)

WAKEUP the Clients to start the communication

After the clients are successfully paired, they are automatically switched into a Sleep Mode. In order to start the data communication, the Clients need to be woken up:

1. Press the "WAKEUP" Button **"B"** at all Clients. The "WAKEUP" Button is blinking red. As soon as the communication is running the WAKEUP Button is blinking green.
2. Press the "WAKEUP" Button **"B"** at the Master. The Master starts again the communication and the Clients begin to send data. As soon as the Master receives valid data, the WAKEUP Button at the Master is blinking green as well. Transmitted, received and lost packages are indicated via LEDs "**TRANS-PACK"**, **"RCV-PACK"** and **"LOST-PACK"**.
3. The brightness sensor can be seen on the GUI (Master) and actual data can be changed at the Clients by shading the sensor.
4. Once the connection to one Client is lost, the appropriate Client stops blinking "**TRANS-PACK"** and **"RCV-PACK"**. If the Client is again very close to the Master the connection is re-established automatically. "**TRANS-PACK"** and **"RCV-PACK"** starts to blink again.

Note: Pressing the WAKEUP Button **"B"** at the Master, starts and stops the communication.

If there are questions do not hesitate to contact us. See contact information at the end of this manual.

Layout of Demo Board

Board schematics

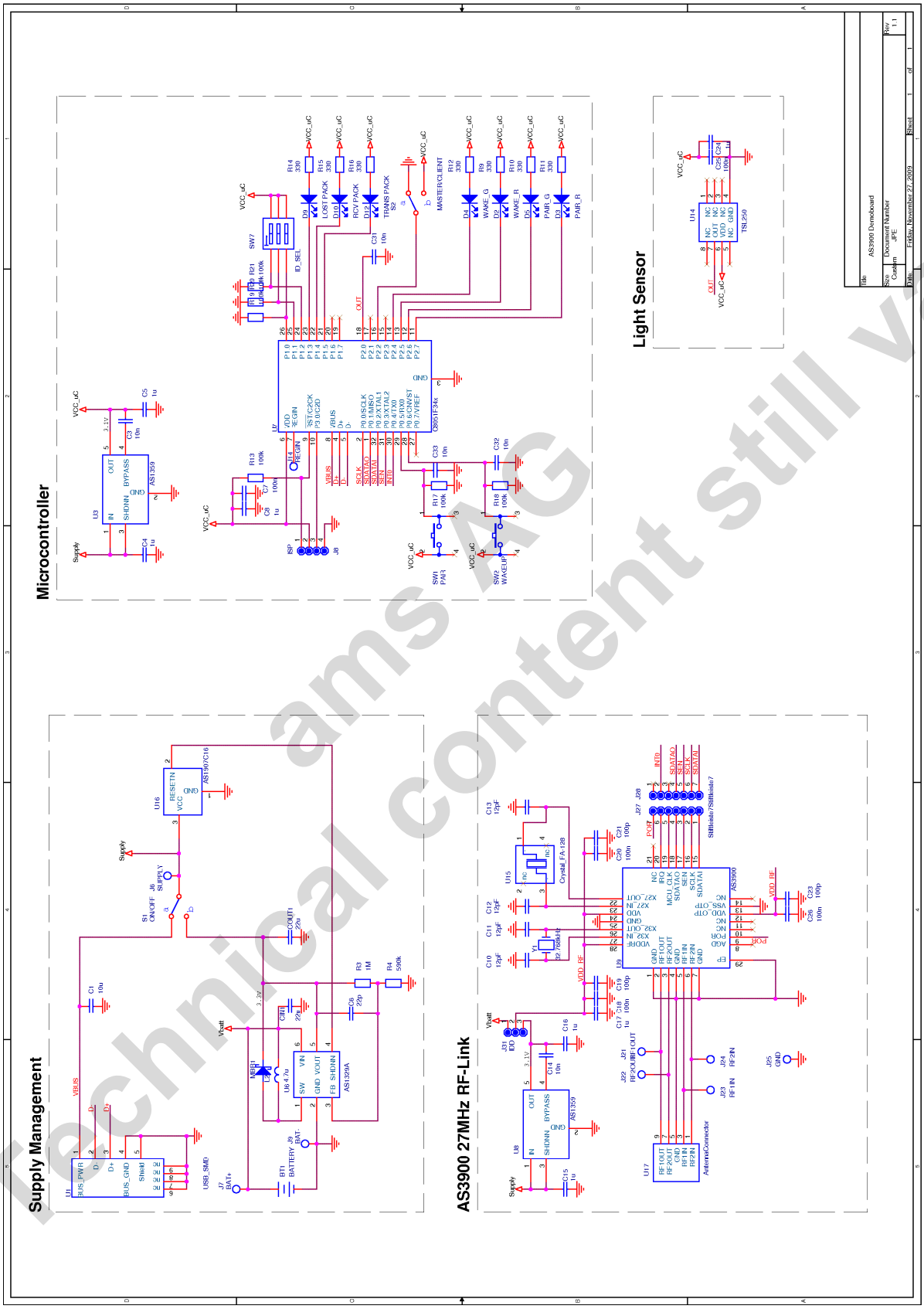


Figure 3: Schematics

Board layout

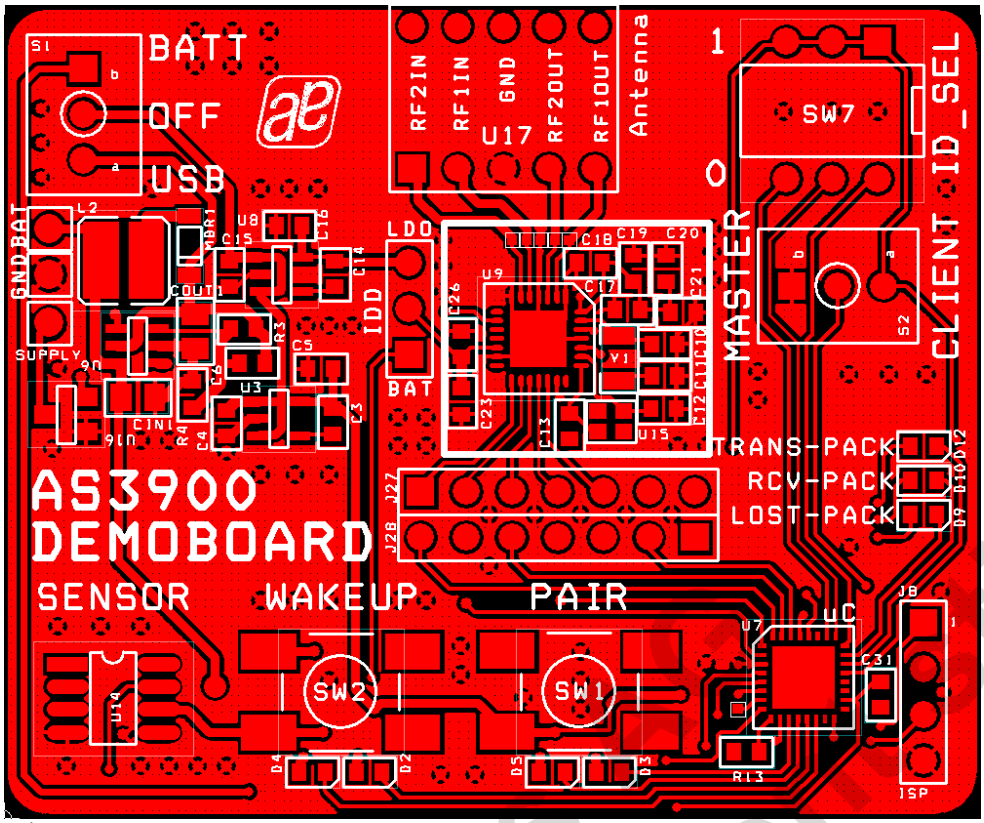


Figure 4: Top Layer

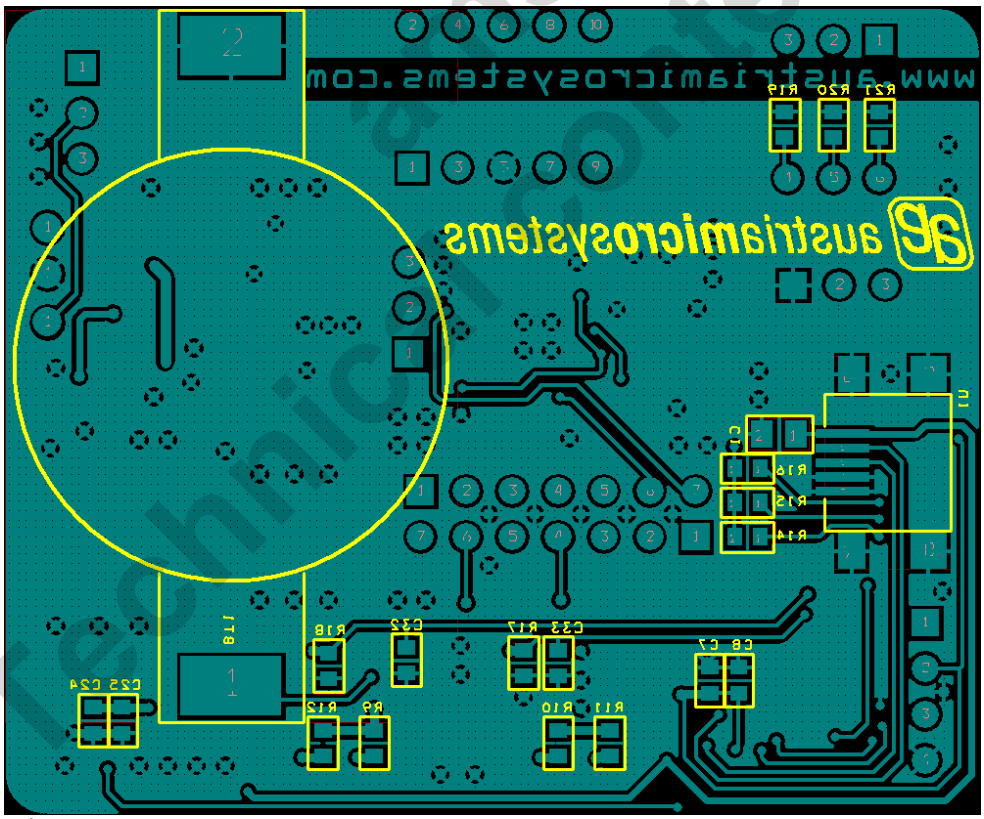


Figure 5: Bottom Layer

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