EC2X&AG35-QuecOpen

SGMII API MANUAL

LTE Module Series

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About the Document

History

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1 Introduction

This document introduces SGMII functions and related API.

2 SGMII Introductions

SGMII is the interface between PHY and MAC which similar with GMII and RGMII, yet GMII and RGMII are parallel, and need line clock, PCB layout is relatively troublesome, and not suitable for backplane applications. The SGMII is serial, no need to provide additional clock, MAC and PHY need CDR to recover the clock. In addition SGMII is with 8B / 10b encoded, the rate is 1.25G.

Currently, the EC20 and AG35 module only support the AR8033 PHY chip, 10BASE-Te / 100BASE-Te / 1000BASE-Te IEEE802.3 compliant.

3 API Interface Introduction

Linux does not enable GSMII function by default, interfaces provided are as followings.

3.1. ql_sgmii_enable

```
/**
 * Enables the SGMII ethernet module.
 *
 * @param None
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 */
extern int ql_sgmii_enable(void);
```

Enable SGMII function, calling the function to load the SGMII driver. After successful loading, eth0 network port can be seen under the console, as shown in following picture.

```
~ # ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:80:48:BA:D1:30
          inet addr:169.254.4.1  Bcast:169.254.4.255  Mask:255.255.255.0
          inet6 addr: fe80::280:48ff:feba:d130/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:398 errors:0 dropped:0 overruns:0 frame:0
          TX packets:17 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:40956 (39.9 KiB)  TX bytes:1405 (1.3 KiB)
          Interrupt:48

~ #
```

After the network port booting successfully, qti program will capture the startup event and notify the QCMAP_ConnectionManager process to load the eth0 device onto bridge0, as shown in following picture.

```
~ # brctl show
bridge name     bridge id               STP enabled     interfaces
bridge0         8000.fa85eccde650       no              eth0
~ #
```

NOTE

The default MAC address of the eth0 interface is 00: 80: 48: BA: D1: 30. If users need to change this MAC address, can through cmd (for example: ifconfig eth0 hw ether 00: 80: 48: BA: d1: 30), also can modify the address settings in the SGMII startup script (/etc/init.d/start_emac_le).

3.2. ql_sgmii_disable

```
/**
 * Disable the SGMII ethernet module.
 *
 * @param None
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 */
extern int ql_sgmii_disable(void);
```

Disable SGMII feature, calling this function, eth0 network port will be removed from bridge0 and SGMII driver will be uninstalled.

3.3. ql_sgmii_speed_set

```
/**
 * Set the SGMII ethernet configuration: the ethernet auto negotiation configuration.
 *
 * @param [in]              auto negotiation
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
extern int ql_sgmii_autoneg_set(ql_sgmii_autoneg_e autoneg);
```

Set the network port rate, support 10MHZ/ 100MHZ/ 1000MHZ, the default is adaptive, the macro definition is as followings.

```
typedef enum {
        QL_SGMII_SPEED_AUTO = 0,     //Adaptive
        QL_SGMII_SPEED_10MHZ,        //10MHZ
        QL_SGMII_SPEED_100MHZ,       //100MHZ
        QL_SGMII_SPEED_1000MHZ     // 1000MHZ
} ql_sgmii_speed_e;
```

3.4. ql_sgmii_speed_get

```
/**
 * Get the SGMII ethernet configuration: the ethernet speed configuration.
 *
 * @param [out]              the ethernet current speed
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
extern int ql_sgmii_speed_get(ql_sgmii_speed_e *speed);
```

Get the rate of the current network port.

3.5. ql_sgmii_duplex_set

```
/**
 * Set the SGMII ethernet configuration: the ethernet duplex configuration.
 *
 * @param [in]               ethernet duplex
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
```

```
extern int ql_sgmii_duplex_set(ql_sgmii_duplex_e duplex);
```

Set the network port duplex mode, support half-duplex and full-duplex, the macro definition is as following.

```
typedef enum {
        QL_SGMII_DUPLEX_FULL = 0,       //half-duplex
        QL_SGMII_DUPLEX_HALF            // full-duplex
} ql_sgmii_duplex_e;
```

NOTE

By calling this function, network port rate cannot be set as QL_SGMII_SPEED_AUTO. For the gigabit rate AR8033 chip, it only supports full duplex.

3.6. ql_sgmii_duplex_get

```
/**
 * Get the SGMII ethernet configuration: the ethernet duplex configuration.
 *
 * @param [out]             the ethernet current duplex
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
extern int ql_sgmii_duplex_get(ql_sgmii_duplex_e *duplex);
```

Get the duplex mode set by network port.

3.7. ql_sgmii_autoneg_set

```
/**
 * Set the SGMII ethernet configuration: the ethernet auto negotiation configuration.
 *
 * @param [in]              auto negotiation
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
```

```
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
extern int ql_sgmii_autoneg_set(ql_sgmii_autoneg_e autoneg);
```

Set whether the Ethernet card is in adaptive mode, and its macro definition is as follows.

```
typedef enum {
        QL_SGMII_AUTONEG_OFF = 0,
        QL_SGMII_AUTONEG_ON
} ql_sgmii_autoneg_e;
```

3.8. ql_sgmii_autoneg_get

```
/**
 * Get the SGMII ethernet configuration: the ethernet auto negotiation configuration.
 *
 * @param [out]             auto negotiation
 *
 * @return
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
extern int ql_sgmii_autoneg_get(ql_sgmii_autoneg_e *autoneg);
```

Get whether the Ethernet card is in adaptive mode

3.9. ql_smgii_info_get

```
/**
 * Get the sgmii ethernet information: transmit and receive bytes, transmit and receive packets, speed, duplex.
 *
 * @param [out]             the ethernet information
 *
 * @return
```

```
 *     On success, 0 is returned.    On error, -1 is returned.
 *
 * @dependencies
 *     the ql_sgmii_enable must be set enable
 *
 */
extern int ql_smgii_info_get(struct ql_sgmii_info *info);
```

Get the current status of the network port, including the number of data packets sent and received, the data size, the running rate and running duplex mode.

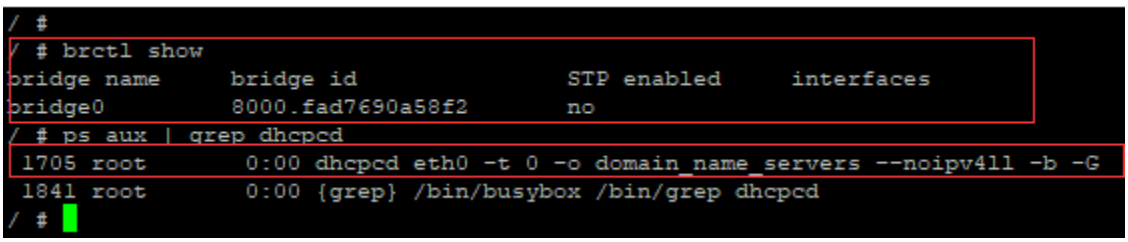
NOTE

Before calling interface (3)-(9), please call ql_sgmii_enable() at first.

3.10. QL_Ethernet_Mode_Set

```
/**
* Sets Ethernet Tethering Mode.
*
* @param [in]     ethernet tethering mode
*
* @return
*     On success, 0 is returned.    On error, -1 is returned.
*
*/
extern int QL_Ethernet_Mode_Set(ql_ethernet_mode_e mode);
```

Set the Ethernet mode, default is LAN Route mode.
Ethernet mode: WAN Route mode, LAN Route mode.
LAN Route mode: Ethernet card provide network services for opposite equipment such as PC.
WAN Route mode: Provide network services to modules through opposite equipment (such as switches). In this mode, the eth0 port will not be added to the bridge0, and the udhcpc will be used to obtain the IP address. As shown in following.



NOTE

This interface is only used for AG35 module.

3.11. QL_Ethernet_Mode_Get

```
/**
* Gets Ethernet Tethering Mode.
*
* @param [out]      ethernet tethering mode
*
* @return
*      On success, 0 is returned.    On error, -1 is returned.
*
*/
extern int QL_Ethernet_Mode_Get(ql_ethernet_mode_e *mode);
```

Get the current Ethernet mode.

4 Example

Please refer to **example/sgmii/example_sgmii.c**.

```
int main(int argc, char **argv)
{
        ql_sgmii_enable();
        ql_sgmii_speed_duplex_set(QL_SGMII_SPEED_100MHZ, QL_SGMII_DUPLEX_FULL);
        return 0;
}
```

NOTE

Configuration saving is not supported at present.