Practical Training 2

MRFI communication and data typs

Practical training 2

- MRFI Data Link/Physical Layer
  - CRC
  - RSSI
  - LQI
  - Simple Chat

MRFI functions

```
BSP_Init();                    // Hardware init

MRFI_Init();                   // Init the registers

MRFI_WakeUp();                 // wake up the radio

MRFI_RxOn();                   // turn into Rx mode

MRFI_SetRFPwr(0);              // RF transmitting power (0 to 2)


mrfiRadioInterfaceWriteReg(PKTCTRL0,0x05); // CRC on (0x05)
```


MRFI functions

```
smplStatus_t SMPL_Init(uint8_t (*f)(linkID_t){
    ...
}

mrfiPacket_t packet;

packet.frame[0]=0x14;


while(MRFI_TX_RESULT_SUCCESS!=MRFI_Transmit(&packet, MRFI_TX_TYPE_FORCED));
```


MRFI functions

function callback

```
smplStatus_t SMPL_Init(uint8_t (*f)(linkID_t){
    ...
}
```

typdef + struct

```
mrfiPacket_t packet;

packet.frame[0]=0x14;
```

pointer

```
while(MRFI_TX_RESULT_SUCCESS!=MRFI_Transmit(&packet, MRFI_TX_TYPE_FORCED));
```

enum

pointer

```
int i = 10;

int *p;

p = &i;
```

i	&i	*i
10	0x0310	

p	&p	*p
0x0310	0x0400	10

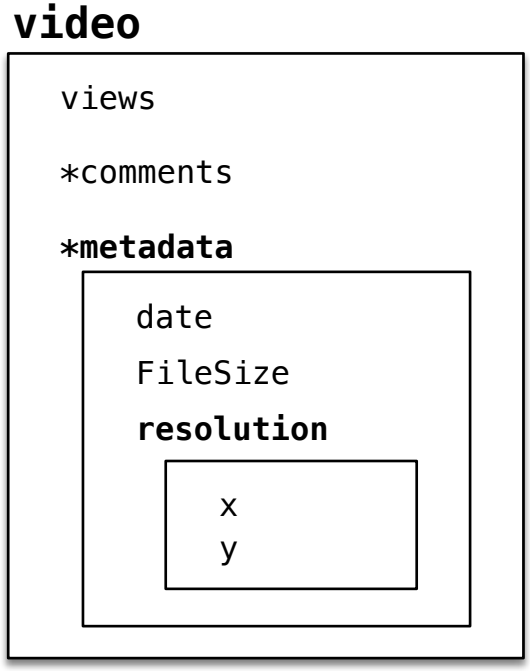
typedef

typedef	existing type	name

```
typedef   int32_t   views;

typedef   int16_t   *comments;
```


struct

```
typedef struct{
    int x;
    int y;
} resolution;


typedef struct{
    int date;
    int Filesize;
    resolution resolution;
} metadata;


typedef struct{
    views views;
    comments comments;
    metadata *metadata;
} video;
```



function callback

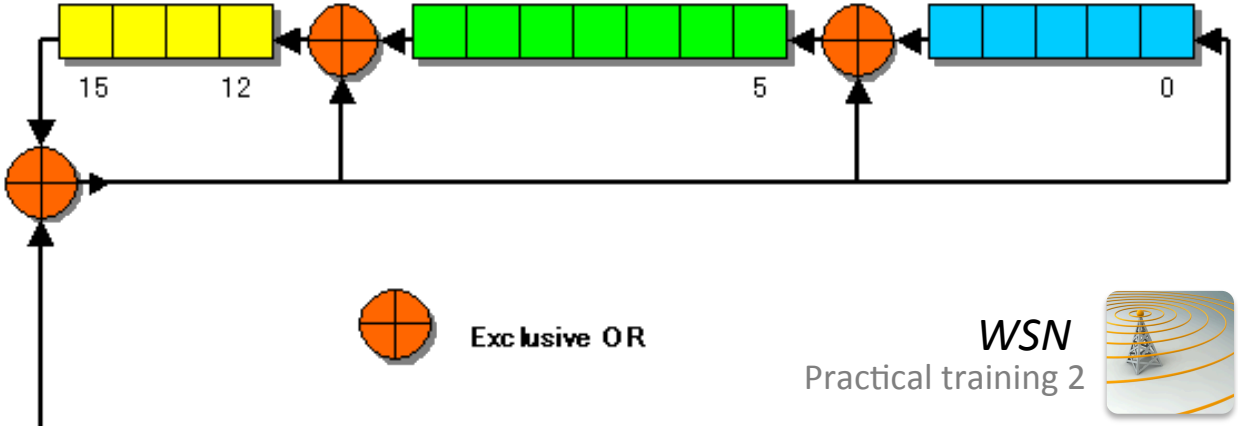
```
void function(void (*CB)(int)){
    CB(2);
}


void CB_neg(int val){
    printf("callback %i arrived\r\n",-val);
}


int main(void) {
    function(&CB_neg);
...
```


enum

```
Enum status {
    STATUS_SUCCESS,
    STATUS_BAD
    STATUS_TIMEOUT
};
```


Cyclic Redundancy Check (CRC)

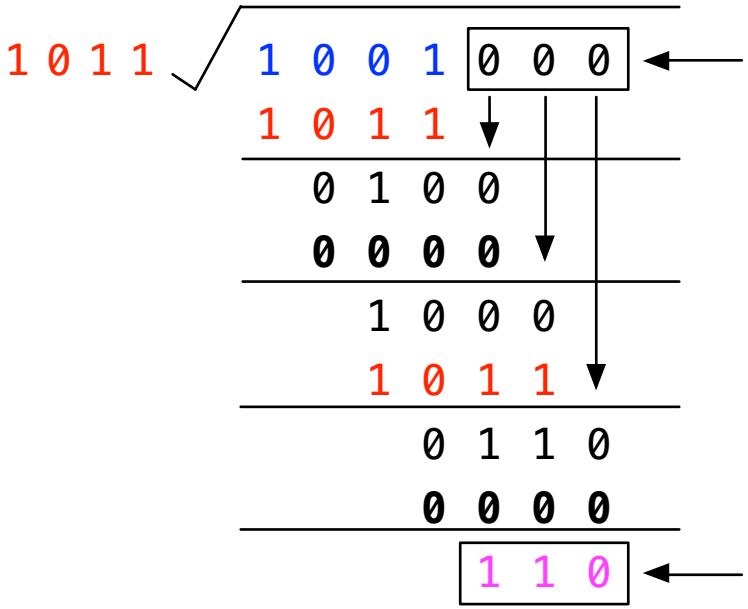
- Detect accidental change of data during transmission
- A short check value gets attached to the message
- The attached value is the remainder of a polynomial division

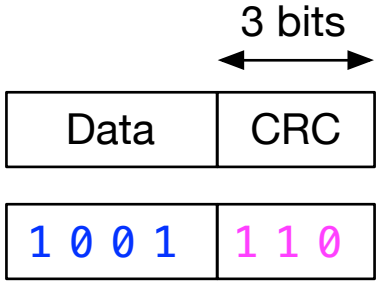


CRC example

Data: 1 0 0 1

Divisor: 1 0 1 1 polynomial: $x^3 + x^1 + 1$

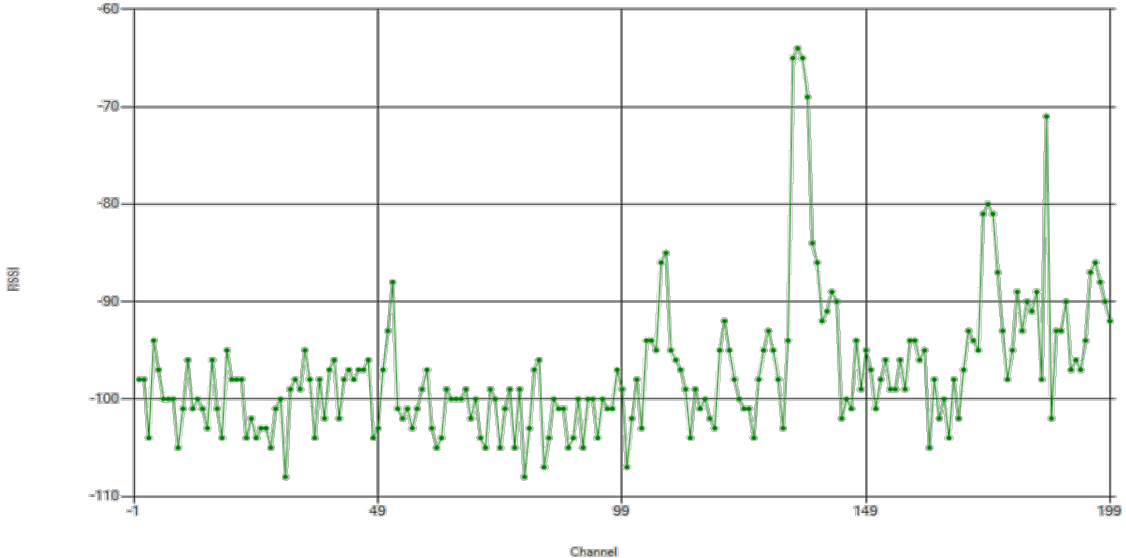




CRC length equals divisor length-1

Received Signal Strength Indicator (RSSI)

- Indicates the power received in a transmission
- The `MRFI_Rssi()` function provides the RSSI value
- Often used to detect the noise in a specific channel



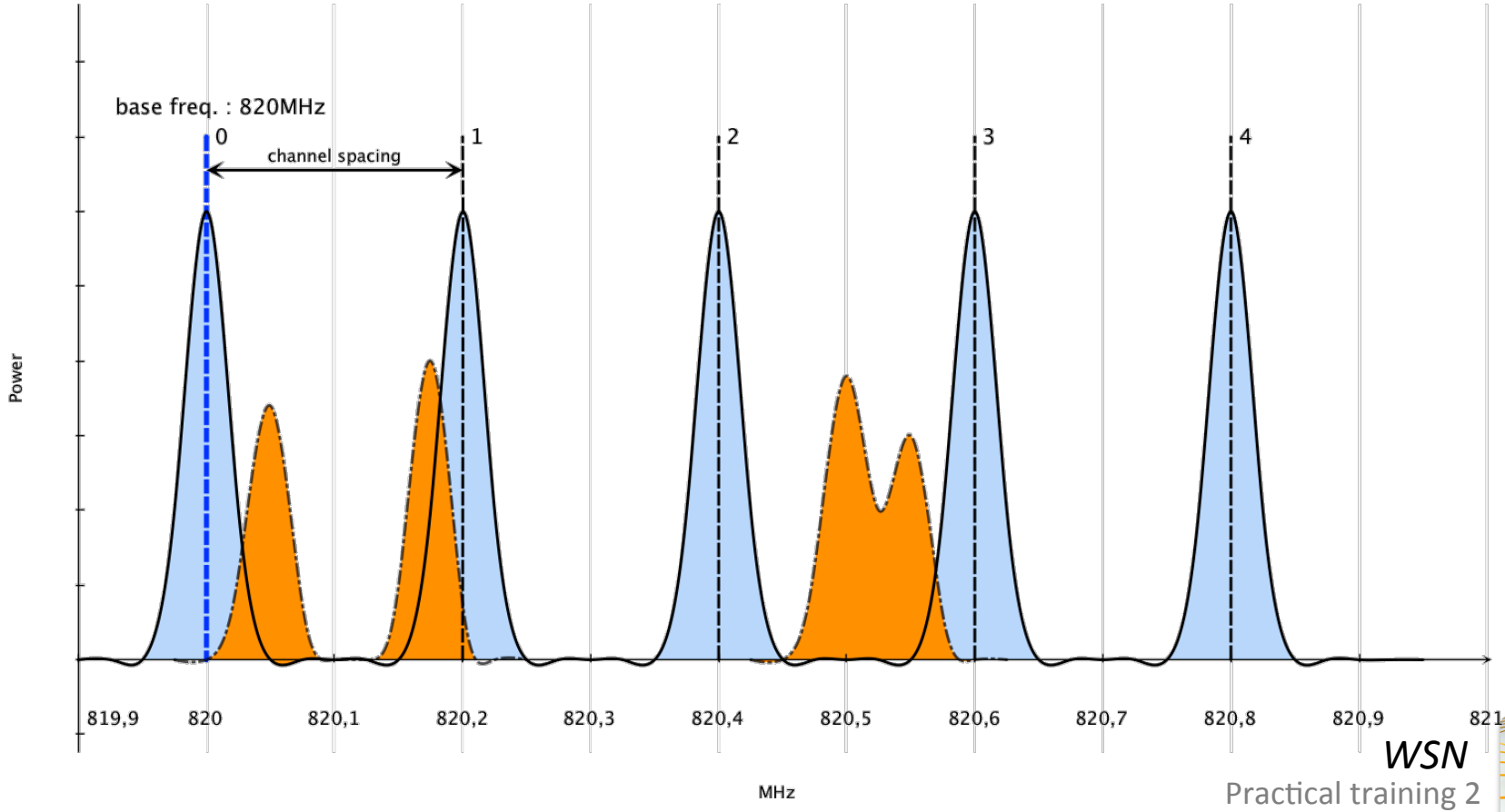
Link Quality Indicator (LQI)

- LQI is a metric of the current quality of the received signal
- relative measurement
- a low value indicates a better link

```
// value located at
packet.rxMetrics[MRFI_RX_METRICS_CRC_LQI_OFS];
```

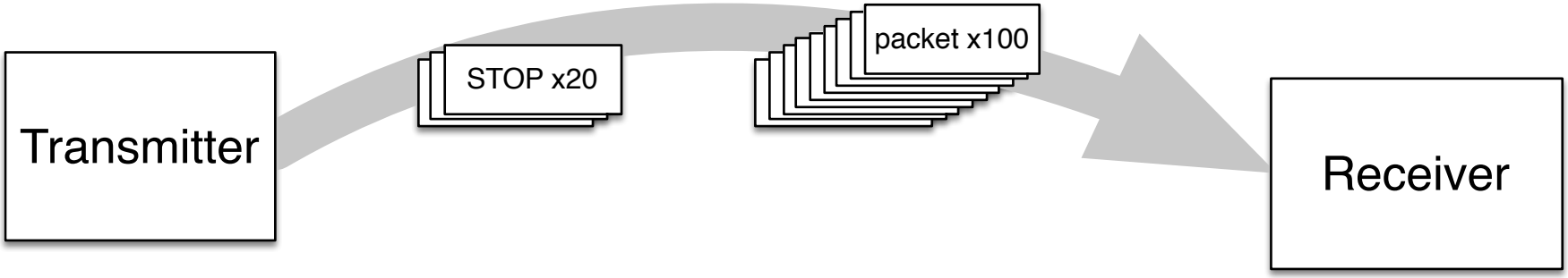

LQI

RF Transmission Frequencies



LQI / received packets

- 100 packets + 20 STOP packets



Simple Chat

- Terminal based IRC (Internet Relay Chat)