

Prox QR library client (examples)

Parsec QR Library examples for PNR QX29 family of a proximity readers.
Author Dmitry Bogdan. For support please contact Support

Manipulating with a library context

Structure `struct qr_context` is designated to communicate with the library.
Library user must deal only with a pointer to mentioned structure.

Create context

Methods: `qr_new_ctx()` and `qr_default_ctx()` are responsible for context creation.

Accepted `qr_new_ctx()` argument is a pointer to a private key.

Example create context example with a pre-defined key

```
qr_AesKey_t qr_zero_key = {
    0x00, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x00, 0x00};

struct qr_context *ctx = qr_new_ctx((const qr_AesKey_t *)qr_zero_key);
```

In this above example we create library context with a key `qr_zero_key` filled with zeroes.

`qr_new_default_ctx()` does not accept any arguments. It just creates context with a Parsec factory secret default key. Here is an example below.

Example create context with a default key

```
struct qr_context *ctx = qr_new_default_ctx();

if (ctx != NULL)
{
    // do great things
}
```

After acquiring ctx pointer, please perform a NULL reference validation.

See a next paragraph for context destroy.

Destroy context

Library context shall be disposed after usage with a `qr_delete_ctx()` method (accepted argument is previously created context).

Destroy context example

```
// create context with the default key
struct qr_context *ctx = qr_new_default_ctx();

if (ctx != NULL) {
    qr_delete_ctx(ctx);
}
```

QR code generation: 4 and 7 bytes

QR code generation: Generate 4 byte code

Used method: *qr_GenId4()*. Argument list: *struct qr_context *context*, *uint32_t Identifier*, *uint8_t *result_address*.

Please note that encrypted result is ASCII string, so here and in all examples below we will reserve one character for a zero string termination. Standard *printf()* method provided by C library will print the string for us.

Example 4 byte code QR code creation

```
int example_gen4()
{
    int result = QR_RESULT_ERR;

    uint8_t encrypted_result[QR_DATA_STRUCT_LEN_ASCII + 1];
    encrypted_result[QR_DATA_STRUCT_LEN_ASCII] = 0;

    struct qr_context *ctx = qr_new_default_ctx();

    if (ctx != NULL)
    {
        result = qr_GenId4(ctx, 0x12345678, encrypted_result);
        qr_delete_ctx(ctx);
    }

    if (result == QR_RESULT_OK)
    {
        printf("encrypted with default key, id4: 0x12345678: %s\n", encrypted_result);
    }
    else
    {
        printf("failed to encrypt id4\n");
    }

    return result;
}
```

Expected result for this gen4 example is a string: A387DFD6A95D6710C5CBAA84DD732CDF6806A07C3D7ADF16B7ADF0A
https://duckduckgo.com/?q=QR+A387DFD6A95D6710C5CBAA84DD732CDF6806A07C3D7ADF16B7ADF0A
t=ffnt&ia=answer

QR code generation: Generate 7 byte code

Used method: *example_gen7()*. Argument list: `struct qr_context *context`, `uint64_t Identifier`, `uint8_t *result_address`. Synthax is the same as for ID4 with the Identifier size exception: it is *uint64_t* and high byte will be zeroed.

Example 7 byte QR code generation

```
int example_gen4()
{
    int result = QR_RESULT_ERR;

    uint8_t encrypted_result[QR_DATA_STRUCT_LEN_ASCII + 1];
    encrypted_result[QR_DATA_STRUCT_LEN_ASCII] = 0;

    struct qr_context *ctx = qr_new_default_ctx();

    if (ctx != NULL)
    {
        result = qr_GenId7(ctx, 0x123456789ABCDE, encrypted_result);
        qr_delete_ctx(ctx);
    }

    if (result == QR_RESULT_OK)
    {
        printf("encrypted with default key, id7: 0x123456789ABCDE: %s\n", encrypted_result);
    }
    else
    {
        printf("failed to encrypt id7\n");
    }

    return result;
}
```

Expected result for this gen7 example is a string: D09DAB75599CC79FF11854EEE18D32FCCD300F4B9C901D0C
Duckduck QR code: https://duckduckgo.com/?q=QR+D09DAB75599CC79FF11854EEE18D32FCCD300F4B9C
t=ffnt&ia=answer

Light configuration

To perform light sensor and target light LED configuration.

Used method: `qr_GenLightConf()`. Argument list: `struct qr_context *context, uint8_t light_mode, uint16_t light_threshold, uint8_t target_mode, uint8_t *result_address`.

Argument `light_mode` accepted values are:

Value	description
QR_LIGHT_AUTO_BY_MOTION_SENSOR	by motion sensor
QR_LIGHT_ON	always on
QR_LIGHT_OFF	always off
QR_LIGHT_AUTO_BY_ILLUMINANCE	on when illuminance is lower than threshold

Argument ‘`light_threshold`’ accepted values

When `light_mode` is set to `QR_LIGHT_AUTO_BY_ILLUMINANCE`, `light_threshold` arguments can be set between `QR_LIGHT_THRESHOLD_LUX_LOW` (approx 100 lux) and `QR_LIGHT_THRESHOLD_LUX_HIGH` (approx 500 lux).

Argument `target_mode` accepted values

Value	description
QR_TARGET_AUTO	by motion sensor
QR_TARGET_ON	always on
QR_TARGET_OFF	always off

Light coinfiguration example

```
int example_genlight() {
    int result = QR_RESULT_ERR;

    uint8_t encrypted_result[QR_DATA_STRUCT_LEN_ASCII + 1];
    encrypted_result[QR_DATA_STRUCT_LEN_ASCII] = 0;

    struct qr_context *ctx = qr_new_default_ctx();

    if (ctx != NULL)
    {
        result = qr_GenLightConf(ctx, QR_LIGHT_AUTO_BY_ILLUMINANCE, 300, QR_TARGET_AUTO, encrypted_result);
        qr_delete_ctx(ctx);
    }

    if (result == QR_RESULT_OK)
    {

```

```

        printf("encrypted light config: %s\n", encrypted_result);
    }
    else
    {
        printf("failed to encrypt light config\n");
    }

    return result;
}

```

Expected result for this set light example is a string: 1AE2BA9B78EB77D2DBA68693B067AE9113C7CA9CD361

Duckduck QR code: [https://duckduckgo.com/?q=QR+1AE2BA9B78EB77D2DBA68693B067AE9113C7CA9CD](https://duckduckgo.com/?q=QR+1AE2BA9B78EB77D2DBA68693B067AE9113C7CA9CD&t=ffnt&ia=answer)

QR code generation Set key to a new one

When one wish to change key to a new one (to perform a default key replacement, *qr_GenSetAesKey()* method shall be used. Library context shall be initialized with a Proximity reader key (context with a default key is used here below).

Set key to a new one example

Here is the example of resetting default key to a key filled with a hexadecimal zeroes.

```

int example_gensetkey()
{
    int result = QR_RESULT_ERR;

    qr_AesKey_t qr_zero_key = {
        0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00};

    uint8_t encrypted_result[QR_DATA_STRUCT_LEN_ASCII + 1];
    encrypted_result[QR_DATA_STRUCT_LEN_ASCII] = 0;

    struct qr_context *ctx = qr_new_default_ctx();

    if (ctx != NULL)
    {
        result = qr_GenSetAesKey(ctx, (const qr_AesKey_t *)qr_zero_key, encrypted_result);
        qr_delete_ctx(ctx);
    }

    if (result == QR_RESULT_OK)

```

```

    {
        printf("set default to zero key: %s\n", encrypted_result);
    }
    else
    {
        printf("failed to encrypt zero key\n");
    }

    return result;
}

```

Expected result for this setkey example is a string: 6D9BB6C6AC6C72A7A25AE7A93B75403D39D8BC42CDEF6

Duckduck QR code: <https://duckduckgo.com/?q=QR+6D9BB6C6AC6C72A7A25AE7A93B75403D39D8BC42CDEF6&t=ffnt&ia=answer>

QR code generation Reset key to default

When one wish to change key to default (to perform a key reset), *qr_GenSetDefaultKey()* method shall be used. Library context shall be initialized with a Proximity reader key (filled with zeroes for example).

Reset key from zero to default

Here is the example of resetting zero key to default key:

```

int example_gensetdefaultkey()
{
    int result = QR_RESULT_ERR;

    qr_AesKey_t qr_zero_key = {
        0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00};

    uint8_t encrypted_result[QR_DATA_STRUCT_LEN_ASCII + 1];
    encrypted_result[QR_DATA_STRUCT_LEN_ASCII] = 0;

    struct qr_context *ctx = qr_new_ctx((const qr_AesKey_t *)qr_zero_key);

    if (ctx != NULL)
    {
        result = qr_GenSetDefaultAesKey(ctx, encrypted_result);
        qr_delete_ctx(ctx);
    }

    if (result == QR_RESULT_OK)

```

```

    {
        printf("reset zero key to default: %s\n", encrypted_result);
    }
    else
    {
        printf("failed to reset zero key to default\n");
    }

    return result;
}

```

Expected result for this setdefkey example is a string:

A60040368F15F3D9912297C4E80E190345B2A555231E5AE8EBC3EEBAB6944F11910AD590B1248816DA6DEB

Duckduck QR code: <https://duckduckgo.com/?q=QR+A60040368F15F3D9912297C4E80E190345B2A555231E5AE8EBC3EEBAB6944F11910AD590B1248816DA6DEB&t=ffnt&ia=answer>

QR code generation resources

Duckduck search engine

<https://duckduckgo.com>

QR-code-generator

<https://www.qr-code-generator.com/>

The QR code generator

<https://www.the-qrcode-generator.com/>