

# *C Programming Manual*

## *ProtoTx RF Upconverter*



A Technology Service Corporation Company 

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## ProtoTx Function List

Below is the list of available functions for interaction with the ProtoTx device.

protoTx_Open .....	Opens protoTx connections
protoTx_Close .....	Closes a connection
protoTx_Preset .....	Initializes the device to the preset state
protoTx_ReadInfo .....	Returns the protoTx settings
protoTx_ReadLD .....	Returns the lock detect state
protoTx_ReadStatus .....	Returns all protoTx output settings
protoTx_SaveUserPreset .....	Saves the current settings into preset
protoTx_WriteStatus .....	Writes the protoTx output settings

## Function Documentation

### protoTx\_Open

Returns a list of all available protoTx devices connected to the system and their corresponding instrument handles and serial numbers.

```
int protoTx_Open(FT_STATUS *status, int *devicesFound, int handles[], int serialNumbers[]);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
int * devicesFound	Number of valid protoTx devices found
int handles[]	List of protoTx device handles
int serialNumbers[]	List of protoTx device serial numbers

*Return Values:*

0	OK
-1	No devices found
-2	FTDI error status

### protoTx\_Close

Closes the specific protoTx connection.

```
int protoTx_Close(FT_HANDLE handle);
```

FT_HANDLE handle	protoTx instrument handle
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*Return Values:*

Always returns the FTDI error status

## protoTx\_Preset

Sets the protoTx to the User Preset.

```
void protoTx_Preset(FT_STATUS *status, FT_HANDLE handle);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
FT_HANDLE handle	protoTx instrument handle

*Return Values:*

None

## protoTx\_ReadInfo

Returns the protoTx hardware information.

```
int protoTx_ReadInfo(FT_STATUS *status, FT_HANDLE handle, int *SN, char *fRev, char *hRev, char *calDate, char *IFband);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
FT_HANDLE handle	protoTx instrument handle
int * SN	protoTx Serial Number
char * fRev	protoTx Firmware Revision
char * hRev	protoTx Hardware Revision
char * calDate	protoTx Calibration Date
char * IFband	protoTx IF band option

*Return Values:*

0	OK
-1	Cannot read Serial Number LSB
-2	Cannot read Serial Number MSB

## protoTx\_ReadLD

Returns the status of the protoTx lock detect.

```
int protoTx_ReadLD(FT_STATUS *status, FT_HANDLE handle, int *LDstatus);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
FT_HANDLE handle	protoTx instrument handle
int * LDstatus	Lock Detect Status (1=Lock 0=Not locked)

*Return Values:*

0	OK
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## protoTx\_ReadStatus

Returns the protoTx output settings.

```
int protoTx_ReadStatus(FT_STATUS *status, FT_HANDLE handle, double Values[]);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
FT_HANDLE handle	protoTx instrument handle
double Values[]	protoTx output settings

*Values[] Breakout:*

0	I DC Offset
1	Q DC Offset
2	LO Frequency (MHz)
3	Max Leveled Output power (dBm)
4	RF Power (dBm)
5	RF Attenuation (dB)
6	Operating Mode (0= I/Q, 1= LO+IF, 2= LO-IF, 3= Syn)
7	Preset Mode (0= User, 1= Factory)
8	10 MHz Reference (0= Int, 1= Ext)
9	LO Nulling (2 = Factory DC Offsets, 0= Manual DC Offsets)
10	RF Low Pass Filter (0 = 500MHz, 1= 950 MHz, 2= 1700MHz, 3 = 3250 MHz, 4= 5500 MHz)
11	RF Output (0= Off, 1= On)
12	LO Source (0= Internal, 1= External)
13	Minimum Output Power (dBm)

*Return Values:*

0	OK
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## protoTx\_SaveUserPreset

Saves the current protoTx configuration into the User Preset.

```
void protoTx_SaveUserPreset(FT_STATUS *status, FT_HANDLE handle);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
FT_HANDLE handle	protoTx instrument handle

*Return Values:*

None

## protoTx\_WriteStatus

Programs the protoTx to the desired output configuration.

```
void protoTx_WriteStatus(FT_STATUS *status, FT_HANDLE handle, double Values[]);
```

FT_STATUS * status	ULONG representing the FTDI driver error status
FT_HANDLE handle	protoTx instrument handle
double Values[]	protoTx output settings

### *Values[] Breakout:*

- 0 I DC Offset
- 1 Q DC Offset
- 2 LO Frequency (MHz)
- 3 RF Power (dBm)
- 4 RF Attenuation (dB)
- 5 Operating Mode (0= I/Q, 1= LO+IF, 2= LO-IF, 3= Syn)
- 6 Preset Mode (0= User, 1= Factory)
- 7 10 MHz Reference (0= Int, 1= Ext)
- 8 LO Nulling (2 = Factory DC Offsets, 0= Manual DC Offsets)
- 9 RF Low Pass Filter (0 = 500MHz, 1= 950 MHz, 2= 1700MHz, 3 = 3250 MHz, 4= 5500 MHz)
- 10 RF Output (0= Off, 1= On)
- 11 LO Source (0= Internal, 1= External)

### *Return Values:*

None