

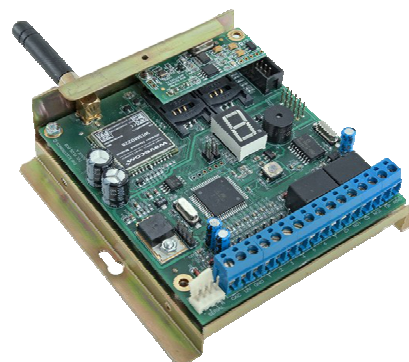
TX CELLULAR PLUS



Hardware:

The TXC+ board consists of the following subsystems:

- 3.3V regulated power supply (Drives the AT45DB161 EEPROM).
- 3.6V regulated power supply (Drives the WISMO228 GSM modem).
- 5V regulated power supply (Drives the ATMEGA128 micro controller).
- Wavecom GSM modem – Wismo228.
- DTMF decoder – MT8870DS.
- Microprocessor – ATMEGA128L.
- EEPROM memory – AT45DB161.
- 2 Subscriber identity modules – GHU780.



The TXC+ has the following hardware interfaces:

- 7 Dry contact inputs (7 to 14VDC)
- 1 Dedicated AC monitoring pin (7 to 17VAC)
- 2 Normally open relay outputs (max 30V 1A)
- DTMF (tip & ring) interface for contact ID.
- Serial data interface 1 – for programming and alarm panel data.
- Serial data interface 2 – for FSK 433MHz receiver board.
- 7 Jumpers for weak input pull-up (one for each dry contact input used in conjunction with trigger low programming option).
- JTAG interface (for development purposes only).
- STK500 interface (for production and testing purposes only).
- 7 segment display.
- Buzzer.
- Push button, for 'learning' remote controls.
- 10 pin box connector for audio interface for voice calls.
- Additional relay outputs and dry contact inputs can be connected to the TXC+ via its serial data interface.

Typical values (measurements done with 13.8 volt power supply):

- Supply voltage: Min 6.5Vdc, Max 15Vdc.
- Power consumption in standby: 90mA
- Power consumption during network interaction:
 - GPRS 460mA
 - SMS/ voice 260mA
- Peak power consumption: 2000mA (not more than 1.5ms in every 4ms)
- GSM Frequency (Quad-band):
 - GSM 850 – TX 824 to 849MHz, RX 869 to 894 MHz
 - GSM 900 – TX 880 to 915MHz, RX 925 to 960 MHz
 - GSM 1800 – TX 1710 to 1785MHz, RX 1805 to 1880 MHz
 - PCS 1900 – TX 1850 to 1910MHz, RX 1930 to 1990 MHz
- Input pin voltage (No jumper) 0.0V
- Input pin voltage (With jumper inserted) 11.0V

Software functions/ features:

Status indicators:

The seven segment display indicates the device state of operation. A flashing full stop indicates that the TXC+ is in standby. Refer to the table below for function and error indicators.

Function display	Meaning
F0	Initialising or resetting the GSM modem
F1	Checking for incoming SMS messages, checking network registration status and signal strength.
F2	Sending SMS.
F3	Connecting / sending via GPRS.
F4	Disconnecting from GPRS.
F5	Hanging up voice call.
F6	Sending a “call me” message.
F7	Obtaining the current date and time from the internet.
C	Calculating boot space CRC
b	Writing flash memory in boot loader
P	Program flash written successfully
Error display	
E0	Device is stunned
E1	SIM error
E2	No GSM network found
E3	SMS sending failed
E4	GPRS failed
E5	No SMS center number

The TXC+ has an on board buzzer. The buzzer will beep once when a new remote was learnt and three times if a remote was deleted from its memory.

If panel functions are enabled and depending on configuration the buzzer will beep during the entry and exit delay period, when arming or disarming and when an alarm is triggered.

Communication options:

- The TXC+ can communicate alarm and device state information using the short message service (SMS) and or the general packet radio service (GPRS) supplied by the relevant cellular service provider.
- The user can provide up to 10 distinct phone numbers for SMS reporting.
- The user can supply 3 server address, port and APN connection settings per SIM for GPRS reporting. When a GPRS connection is required the TXC+ will try each of the 6 connection settings in turn, swapping between SIM cards if necessary.
- All input triggers can be reported via GPRS in standard contact ID form or via SMS using normal text.
- In the event of GPRS failure, GPRS alarms can automatically be reported via SMS to a control room using the FSK GSM base station. The message is in numeric format and must be decoded using an FSK GSM modem (Siemens version).

Inputs and alarm triggers:

- The 7 dry contact inputs can be programmed to send an SMS and or GPRS message when the input is triggered (high/12V) and restored (low/ 0v).
- The CAC is a dedicated AC monitoring input. This is the only input that can be connected to an AC power supply. The input will accept between 7 and 17VAC. This input can be programmed to report an AC fail or restore event using GPRS and or SMS.
Note: The CAC is a delayed input. The CAC must be either high (above 7V AC) or low (0V) for at least 10 minutes before an AC fail or restore signal will be sent. This input will only operate on alternating current (AC).
- The TXC+ DTMF interface can be programmed to monitor DTMF tones in the ADEMCO contact ID format. The contact ID alarms can be reported via GPRS using the standard contact id alarm code or via SMS using the standard contact ID text as defined by SIA. For SMS reporting the user can supply up to 64 zone descriptions and up to 32 user names as an alternative to zone or user numbers. The TXC+ can report these alarms using the alarm panel account code instead of its own account code by programming either a '?' or a '%' as the first digit of its own account code. It will operate as follow:
 - Account code format %xxxxxx. Example "%00001".
 - i. Login: report panel account code.
 - ii. DTMF alarm: report panel account code.
 - iii. Serial alarm: report panel account code.
 - iv. Dry contact: report panel account code.
 - Account code format ?xxxxxx. Example "?00001".
 - i. Login: report own account code.
 - ii. DTMF alarm: report panel account code.
 - iii. Serial alarm: report panel account code.
 - iv. Dry contact: report own account code.

In the number and event specific sending options the user can select specific alarm groups (panics, burglaries, system messages etc.) to be sent to a particular phone number.

- The TXC+ can be set to send alarms received through its serial interface using GPRS or SMS. The standard or closest equivalent Ademco contact id code will be sent via GPRS. The standard or closest equivalent Ademco contact id alarm text will be sent via SMS. The serial interface can be set up to monitor using FSK, Paradox, Pima or Texecom serial alarm protocol. For SMS reporting the user can supply up to 64 zone descriptions and up to 32 user names as an alternative to zone or user numbers.
- The TXC+ can monitor its own supply voltage (Battery voltage) and send an SMS or GPRS message if the supply voltage drops below or rises above the set threshold.
Note: The battery low alarm is a delayed event. The supply voltage must be either high (above threshold) or low (below threshold) for at least 10 minutes before a battery low or restore signal will be sent.
- The TXC+ can be set to send an SMS or GPRS message every time the unit is switched on.
- The TXC+ can be programmed to send an SMS and or GPRS message in response to any one of six FSK remote buttons being pressed. [See remote control functions.](#)
- The TXC+ can be programmed to send an SMS and or GPRS message in response to receiving a voice call from one of the 10 phone numbers programmed into the unit.
- The TXC+ can be programmed to send a test SMS message at specific intervals ranging from 1 to 65500 minutes (1 minute to +- 45 days).
- The TXC+ can be programmed to send a GPRS test message at specific intervals ranging from 1 to 65500 minutes (1 minute to +- 45 days).
- The TXC+ can send a GPRS and or SMS message when any one of the outputs are turned on or off.
- The TXC+ will keep an event log on board to keep record of triggers and events. (this feature is not yet implemented 2010 – 11 - 01)
- At start up the TXC will attempt to retrieve the time of day from a time server. If successful the time will be used to time stamp events going to the event log.

Outputs:

- The TXC+ has two relay outputs on board and can have an optional extra 30 outputs connected to it using its serial data interface.
- The outputs can be commanded to turn on or off by sending an SMS to the unit, by pressing a remote control button or by means of a voice call (missed call).
- Each output can be configured to be a latching or a momentary output. As a momentary output the momentary on time can be set between 1 and 65500 seconds.
- Each output can be configured to return to the previous state that it was in, to turn on or to remain off when the unit is powered up.

Other SMS functions:

- All of the TXC+ programming options and device setup can be done by sending SMS messages to the TXC+. [See appendix A.](#)
- The device status or individual input status can be retrieved via SMS. [See appendix B.](#)
- The TXC+ can accept SMS commands to control the outputs, reset the unit etc. [See appendix C](#) for more information.

Programming and device setup:

The TXC+ is PC programmable using a dongle and serial cable. The TXC+ firmware can also be updated using the same serial interface.

Remote control functions

- The TXC+ can 'learn' up to 200 remote control account codes.
- To add remotes onto the TXC+:
 - Press the button SW1 on the TXC+. The TXC+ will display 'L' to indicate it is in learn mode.
 - Press any button on the remote control.
 - The buzzer will beep once to indicate that the remote was learnt.
 - Pressing the remote button again will remove the remote from the TXC+ 's memory and will be confirmed with 3 beeps from the buzzer.
- To remove/ forget remotes:
 - Pressing and holding down SW1 will erase all remotes from memory and will be confirmed with 3 beeps from the buzzer.
- Each of the 6 remote buttons can be used to turn an output on, off or to toggle the output both ways. Additional to controlling the outputs the TXC+ can report each remote button press via GPRS and or SMS.

Alarm panel functions

The TXC+ can act as a simple self-standing alarm system.

- With panel functions enabled the TXC+ will assume input 7 to be a key switch input, 6 to be a 24 hour panic zone and input 1 to 3 to be normal alarm zones. Input 4 and 5 will be treated as stay zones. Output 1 can act as a dedicated siren output and output 2 as a strobe output.
- The TXC+ can be full or stay -armed and disarmed using the relevant keywords in an SMS.
- The TXC+ can be full armed and disarmed with a high pulse on input 7.
- The TXC+ can be full or stay -armed and disarmed using an FSK remote.
- The TXC+ can be full or stay -armed and disarmed using a missed call.
- The TXC+ can be programmed to report via SMS or GPRS every time it is armed or disarmed.

If connected to an FSK 6 zone alarm panel the TXC+ will issue the relevant arm or disarm command to the 6 zone panel when receiving an arm/ disarm SMS command or missed call.

Appendix A (SMS programming)

To set an option or value, send an SMS to the TXC+ with the item code followed by a single space and the new value.

To retrieve the existing value or setting send an SMS to the TXC+ with the item code followed by a '?'

Use the table below to locate the relevant item code.

Example:

- To change the TXC+ unit description to "Beach house alarm" an SMS can be sent to the TXC+ with the following text: "0 Beach house alarm".
- To change the SMS text that the TXC+ sends when remote button 1 is pressed to "Panic alarm, phone police!" an SMS can be sent to the TXC+ with the following text: "37 Panic alarm, phone police!".
- To retrieve the text message that will be sent when remote button 1 is pressed send an SMS to the TXC+ with the text "37?". Note: When requesting the phone number stored in 1 to 10 the TXC+ will reply with all 10 phone numbers.

Item code	Item	Default value	Max val/ Max Len	Min val
0	Unit description	My alarm system	20	n/a
1	Phone number 1		15	n/a
2	Phone number 2		15	n/a
3	Phone number 3		15	n/a
4	Phone number 4		15	n/a
5	Phone number 5		15	n/a
6	Phone number 6		15	n/a
7	Phone number 7		15	n/a
8	Phone number 8		15	n/a
9	Phone number 9		15	n/a
10	Phone number 10		15	n/a
11	GPRS fallback num		15	n/a
12	Sim 1 SMS Centre number	+27831000002	15	n/a
13	Sim 2 SMS Centre number	+27829119	15	
14	Sim 1 PIN		5	
15	Sim 2 PIN		5	
16	Sim 1 SMS capability?	Enabled	Enabled	Disabled
17	Sim 1 GPRS capability?	Enabled	Enabled	Disabled
18	Sim 2 SMS capability?	Enabled	Enabled	Disabled
19	Sim 2 GPRS capability?	Enabled	Enabled	Disabled
20	Sim 1 Balance enquiry code	*141#	15	
21	Sim 2 Balance enquiry code	*100#	15	
22	GPRS comms fail report number		15	
23	Panel dial number		15	
24 to 33	Phone number permissions (a,s,o,t,d,r,c)			
34	Input 7 override panel dial number	Disabled	Enabled	Disabled
35	Monitor panel serial comms	Disabled	Enabled	Disabled
36	Output SMS command reply options	The TXC replies to output 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 sms commands.	To change send 36, space and a comma delimited list of outputs for which the TXC should reply to SMS commands.	
37	Output missed call command reply options	The TXC replies to output 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 sms commands.	To change send 37, space and a comma delimited list of outputs for which the TXC should reply to missed call commands.	
38	Time server address 1			
39	Time server address 2			
40 to 42	Sim 1 server address			
43 to 45	Sim 2 server address			
46 to 48	Sim 1 port numbers			
49 to 51	Sim 2 port numbers			
52 to 54	Sim 1 APN names			
55 to 57	Sim 2 APN names			
58	AC fail delay			
59	Battery fl restore delay			
60	Batt low thresh			
61	Send GPRS messages via SMS			
1180	GPRS test interval			
1179	SMS self test interval			

62 to 93	Output momentary on times			
94 to 241	Event to phone number links			
242 to 248	Remote button and missed call output on options			
249 to 255	Remote button and missed call output off options			
256 to 402	SMS texts			
403 to 552	GPRS codes			
688 to 719	Input 1 to 32 status request keywords.			
720 to 751	Output 1 to 32 status request keywords			
762	Global status request keyword			
763	Balance enquiry keyword			
764	Away arm keyword			
765	Stay arm keyword			
766	Disarm keyword			
767 to 966	Remote account codes			
967 to 1030	Output high command keywords			
1031 to 1126	Key holder names			
1127 to 1197	Zone panel options			

Appendix B (SMS status requests)

Usage:

To retrieve the TXC+ unit status an SMS can be sent to the TXC+ with the following text: "Status?". The TXC+ will reply with a comprehensive status message.

Keyword	Item	Format	Comments
status?	Get full unit status	status?	Not case sensitive. No spaces
balance?	Get account balance	balance?	Not case sensitive. No spaces
1?	Get input 1 status	1?	Not case sensitive. No spaces
2?	Get input 2 status	2?	Not case sensitive. No spaces
3?	Get input 3 status	3?	Not case sensitive. No spaces
4?	Get input 4 status	4?	Not case sensitive. No spaces
5?	Get input 5 status	5?	Not case sensitive. No spaces
6?	Get input 6 status	6?	Not case sensitive. No spaces
7?	Get input 7 status	7?	Not case sensitive. No spaces
out1?	Get output 1 status	out1?	Not case sensitive. No spaces
out2?	Get output 2 status	out2?	Not case sensitive. No spaces

Appendix C (SMS commands)

Usage:

Send an SMS containing the appropriate keyword to the TXC+.

Keyword	Item	Format	Comments
pwd	Technician Password	pwd [old password] [new password]	Not case sensitive. Single spaces between parameters. Hard coded password: "S3CUR17Y"
1on	Turn output 1 on	1on	Not case sensitive. No spaces
1off	Turn output 1 off	1off	Not case sensitive. No spaces
2on	Turn output 2 on	2on	Not case sensitive. No spaces
2off	Turn output 1 off	2off	Not case sensitive. No spaces
connect	Connect to server	connect [srv addr] [port] [APN optional]	Not case sensitive. Single spaces between parameters. Server address in dotted decimal or url format. APN optional – default "internet"
reset TXC	Reset command	reset TXC	Not case sensitive. Single spaces between words.
STUN TXC	Disable the sending of alarms	STUN TXC	This command is case sensitive. Single spaces between words.
UNSTUN TXC	Enables the sending of alarms.	UNSTUN TXC	This command is case sensitive. Single spaces between words.



FSK TECHNICAL STANDBY NUMBERS:

FRANK : 082 657 7852

RICKUS : 072 595 7700