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TCP Interface

Generel

PR10-12 Can be controlled, remote, by SMS (Text) Messages.

Problems

No Control
Delays
No Delivery
Prices

Control of Program Rain, Using IP data connection

Advantages

Full Control of data packages
“No” delays
Amount of data is near Zero..

We have done “FTP” trial, on 2G and 3G modem, the last year. Connection rate seems OK only with few connections error’s

Data connections, can though be more difficult, since the IP connection, has to stay open for bidirectional communication

Since IP assigning of client “PR10” is dynamical, it has to maintain the connection to server.

The server on the other hand, need to keep track of multi connections and availability of clients..

There are two basic connections

UDP
TCP

We have done basic testing of TCP, peer to peer on modem

TCP Communication

Communication Between Client (PR10-12) and Server (Raindancer) is done by data connection using TCP Protocol. Client etablishes, via GSM, a data connection to server. Once connection is etablished, TCP Packages can be sent bidirectional.

Client sends unsolicited packes upon EVENTs in Irrigation. Server sends REQUESTs to Client. Upon request Client sends RESPONCE to acknowledge request.

Connection

If IP setup is changed or connection is lost, client tryes to reetablish a valid TCP connection.
Within 300 Seconds, upon failure, TCP connection is killed, and a new connection is etablished.

Server Requests

Request to Client (PR10-12) is done by mean of sending JSON records. Client will send response as acknowledge to Request.

Request Limitations:

Max. Length of Request 61 Bytes + mandatory [cr][lf].
Time between Request packages min 3 [s]

Following Requests are available

START,	Start of Irrigation
STOP,	Stop of Irrigation
STATUS,	Current status of Irrigation
VERSION,	Software version.
SET,	Set optional functions
CLR,	Clear optional functions

Following by options

SPEED	Set retraction speed [m/h]
DOSE,	Set Irrigation dose [mm]
PRI,	Set Pre irrigation
POI,	Set Post Irrigation
SPR,	Set Sprinkler
TIM	Set watch on client

Details is in OPTIONS chapter.

START:

Start of Irrigation.

Options:

SPE or DOS
PRI
POI
SPR

Example of Request:

{"REQ":"START"}
{"REQ":"START","DOS":30,"PRI":0,"POI":0}

Example of Reponce :

{"SN":30321,"STATUS":{"MAC":"FARMEN","SPE":30.0,"DOS":22,"DIS":29,"TIM":"11:04:00",
"STO":"01:10:00","PRE":"ON","BAT":12.9,"CHA":412,"SIG":26,"STA":0,"EVE":2}}

STOP:

Stop of Irrigation

Options:

NONE

Example of Request::

{"REQ":"STOP"}

‘

STATUS:

Status of Irrigation

Options:

NONE

Example of Request::

{"REQ":"STATUS"}

VERSION:

Software version

Options:

NONE

Example of Request::

{"REQ":"VERSION"}

SET:

Set optional functions.

Options:

SPE or DOS
PRI
POI
SPR
TIM

Example of Request:

```
{"REQ":"SET","TIM":"11:03:56"}
{"REQ":"SET","DOS":30}
```

CLR:

Clear optional functions.

Options:

PRI
POI
SPR

Example of Request:

```
{"REQ":"CLR","POST":0}
```

OPTION:

SPE:

Retraction speed of hose.
Values 3..500 [m/h]

DOS:

Irrigated Dose.
Values 5..100 [mm]

If SPE or DOS is in Request, selection on client is overridden.
If DOS is selected, client calculates speed upon Machine configuration.

PRI:

Pre Irrigation
Values 0, 1..559[minutes]

If PRI is in Request, Pre irrigation is Activated.
0: Time is calculated by client based upon DOSE.
1..559 Time for Pre Irrigation

POI:

Post Irrigation
Values 0, 1..559[minutes]

If POI is in Request, Post irrigation is Activated.
0: Time is calculated by client based upon DOSE.
1..559 Time for Post Irrigation

SPR:

Sprinkler

Values 0, 1..1439[minutes]

If SPR is in Request, Sprinkler irrigation is Activated.

0: Time is calculated by client based upon DOSE.

1..1439 Time for Sprinkler Irrigation

TIM:

Set watch on Client

Values “00:00:00”..”23:59:59”

Responce:

STATUS:

{"SN":30321,"STATUS":{
"MAC":"FARMEN",
"SPE":30.0,
"DOS":22,
"DIS":0,
"TIM":"11:04:00",
"STO":"00:00:00",
"PRE":"ON",
"BAT":12.9,
"CHA":412,
"SIG":26,
"STA":0,
"EVE":2}}

Using field names

Serial#	SN	Uniq ID, Serial number of Client
Machine	MAC	Machine Name –By User
Speed	SPE	Retraction speed[m/h]
Dose	DOS	Dose [mm]
Distance	DIS	Remaining distance [m]
Time	TIM	Irrigator watch [hh:mm]
Stop	STO	Remaining time [hhh:mm]
Pressure	PRE	Pressure OFF/ON
Bar	BAR	Pressure nn.n[BAR] (optional)
Battery	BAT	Battery voltage nn.n[V]
Charge	CHA	Battery charge current nnnn[mA]
GSM Signal	SIG	GSM Signal 0..31, 99
Status	STA	Status of Irrigation
Event	EVE	Event of Irrigation

VERSION:

{"SN":41215,"VERSION":{
"SW":"2.4T",
"BUILD":"Mar 15 2022 12:11:35",
"GSM":"SIM800F",
"ICCID":"8945061806890022936f"}}

Using field names

Software	SW	Software version
Build	BUILD	Date of sofware build
Modem	GSM	GSM modem type
ICCID	ICCID	Sim card identification number

Position GPS (Optional GPS Position)

{"SN":30321,"POS":{
"SIM7000":
"1,1,20241002073826.000,56.105129,9.684766,98.100,0.00,-0.4,0,,1.0,1.3,0.9,,11,,7.2,5.3"}}

Index	Parameter	Unit	Range	Length
1	GNSS run status	--	0-1	1
2	Fix status	--	0-1	1
3	UTC date & Time	yyyyMMddhhmmss.sss	yyyy: [1980,2039] MM : [1,12] dd: [1,31] hh: [0,23] mm: [0,59] ss.sss:[0.000,60.999]	18
4	Latitude	±dd.dddddd	[-90.000000,90.000000]	10
5	Longitude	±ddd.dddddd	[-180.000000,180.000000]	11
6	MSL Altitude	meters		8
7	Speed Over Ground	Km/hour	[0,999.99]	6
8	Course Over Ground	degrees	[0,360.00]	6
9	Fix Mode	--	0,1,2[1]	1
10	Reserved1			0
11	HDOP	--	[0,99.9]	4
12	PDOP	--	[0,99.9]	4
13	VDOP	--	[0,99.9]	4
14	Reserved2			0
15	GPS Satellites in View	--	[0,99]	2
16	GNSS Satellites Used	--	[0,99]	2
17	GLONASS Satellites in View	--	[0,99]	2
18	Reserved3			0
19	C/N0 max	dBHz	[0,55]	2
20	HPA[2]	meters	[0,9999.9]	6
21	VPA[2]	meters	[0,9999.9]	6
Total：(94) chars				

Responce using following types used both by Status And Events:

Using Events

POWER_ON	= 0,
START_USER	= 1,
START_REMOTE	= 2,
START_PRESSURE	= 3,
START_TIMER	= 4,
RUNNING	= 10,
PRE_IRRIGATION	= 11,
POST_IRRIGATION	= 12,
LOW_PRESSURE	= 13,
SPEED_CHANGE	= 14,
STOP_USER	= 20,
STOP_REMOTE	= 21,
STOP_SENSOR	= 22,
STOP_DISTANCE	= 23,
STOP_SUPERVISION	= 24,
GPS	= 30,
ALIVE	= 40,
STATUS	= 41,
SET	= 42,
CLR	= 43,
CONNECT	= 50,
OTHER	= 99

Exampel:

Start request from server

```
{"REQ":"START"}
```

Responce

```
{"SN":30321,"STATUS":{"MAC":"FARMEN    ",
“SPE":30.0,"DOS":22,"DIS":0,"TIM":"11:04:00","STO":"00:00:00",
"PRE":"ON","BAT":12.9,"CHA":412,"SIG":26,
"STA":0,"EVE":2}}
```

Responce interpreted::

Status: POWER_ON Event: START_REMOTE

Followed by unsolicited responce when Irrigating has started

```
{"SN":30321,"STATUS":{"MAC":"FARMEN    ",
"SPE":30.0,"DOS":22,"DIS":0,"TIM":"11:04:00","STO":"00:00:00",
"PRE":"ON","BAT":12.6,"CHA":472,"SIG":26,
"STA":10,"EVE":10}}
```

Status: RUNNING Event: RUNNING

Setup of constants

Client uses constants to calculate DOSE.

C11 : Water Flow [m3/h]
Values 5..120
C12 : Spacing between Irrigation [m]
Values 1..100

Depending on water pressure and GUN configuration, each machine is setup.

this can be done by server using commands

example:

Server ::
{"CON":"READ" }
or
{"CON":"WRITE","C11":35,"C12":50}
Client ::
{"SN":30321,"CON":"READ","C11":35,"C12":50}

IP Setup

Server is defined by data provider and server, as follows, and could be downloaded by means of SMS message:

```
("IP":"SETUP",
        "WRITE":(
                "APN":"Internet",
                "IP":"21.123.012.001",
                "PORT":5000,
                "USR":"NORTOFT",
                "PWD":"NE",
                "TYPE":0,
                "TIM":300 ))

("IP":"SETUP",
        "WRITE":(
                "APN":"Internet",
                "IP":"portal.nortoft.com",
                "PORT":5000,
                "USR":"NORTOFT",
                "PWD":"NE",
                "TYPE":0,
                "TIM":300 ))


("IP":"SETUP","READ":0)
```

IP : Read or Write

APN	: TEXT	MAX 32 DIGITS	// Access Provider Name
IP	: TEXT	MAX 32 DIGITS	// IP Server Internet IP address or Domain Name
PORT	: VALUE	0-65535	// IP Server Port
USR	: TEXT	MAX 10 DIGITS	// FTP User
PWD	: TEXT	MAX 10 DIGITS	// FTP Password
TYPE	: VALUE	0-4	// FTP Connection type

0 – FTP server.
1 – Explicit FTPS server with AUTH SSL.
2 – Explicit FTPS server with AUTH TLS.
3 – Implicit FTPS server.

TIM:	: VALUE	60-500	// Seconds between ALIVE Responce
SN	: VALUE		// Serial number of PR10-12

Responce by SMS:

```
("IP":"SETUP",
        "READ":(
                "APN":"Internet",
                "IP":"21.123.012.001",
                "PORT":5000,
                "USR":"NORTOFT",
                "PWD":"NE",
                "TYPE":0,
                "TIM":300,
                "SN":30321 ))
```