

Work Time Recorder with Camera

Data protocol

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This equipment has been designed and manufactured to conform to the following EC Standards:

EMC: EN55022:1998+A1:2000

EMC: EN55024:1998+A1:2001

Failure to use the equipment in the manner described in the product literature will invalidate the conformity. A “Declaration of Conformity” statement to the above is available on request.

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Introduction

The **RCPlus** recorder provides an easy way to record the working time and attendance of employees and guests and to keep track of staff on-site presence.



- ✓ Photo registration
- ✓ Fast
- ✓ Simple use
- ✓ Reliable
- ✓ Easy to integrate
- ✓ Water resistant
- ✓ Configurable, open architecture

Recorder runs on Raspbian, Linux based operating system, what provides for an easy integration with any time attendance and payroll system.

It can also be used as an access control terminal, with additional RFID readers installed.

Operating, networking and connectivity

Recorder stores data in a built-in memory. Data consists of TXT files and JPG images taken by a camera.

Recorder communicates with a Time-Attendance-Server (TAS) using various media: LAN, WiFi, GSM (depending on equipment/option/version installed), sending the stored data to the User's TAS. When LAN or GSM connection is used, the terminal obtains IP address automatically (DHCP), for WiFi it requires entering settings manually. By default recorder performs a connection to the TAS according to crontab entry, using configuration data stored in file

```
/usr/local/rcp/synchro
```

Server can be accessed by authorized personnel, such as Accounting, Management, HR for analysis and further use, depending on the access levels and software used for management.



Data organization

All registered data is stored in files. These files are organized in subdirectories within the working directory (/workdir by default). There is one subdirectory for each day, number of subdirectories is limited to 32 (configurable).

There are 2 types of stored data:

- image files, in JPG format, many for each day
- CSV ASCII text files, semicolon separated, one for each day

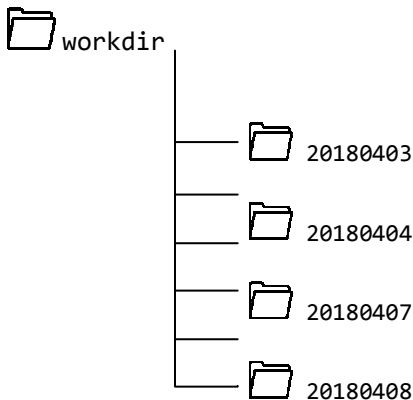
Names of *daily subdirectories* have the form of **yyyymmdd**, where

yyyy - four-digit year, e.g. 2018

mm - two-digit month, e.g. 04

dd - two-digit day, e.g. 02

The illustrative structure of directories looks as below:



Each daily subdirectory contains one CSV text file and many JPG files.

The *text file* has a name in the form of **rcpreg_rcplus_yyyymmdd.txt**, where:

rcpreg - prefix used to distinguish registration files from other TXT files

rcplus - identifier of terminal, max. 20 alphanumeric characters

yyyymmdd - the date in form: year, month and day, as described above

Each line in the file contains one event data (use of RFID reader), using the following format: **userID;yyyy-mm-dd hh:mm:ss;TT**

userID - 8 or 10 chars long, unique alphanumerical user ID,
yyyy-mm-ddhh:mm:ss - recorded date and time stamp of the event
TT - type of an event, can be one of six states, 00, 02, 04 for INs, 01, 03, 05 for OUTss, depending on the RFID and touch button used for an event:

00 - in, no button

02 - in, button P

04 - in, button S

01 - out, no button

03 - out, button P

05 - out, button S

Image files contained in subdirectories have names in the form of

HHMMSS_nnnnnnnn_recorderID_number.jpg, where:

HHMMSS - two-digit hour, two-digit minute and two-digit second

nnnnnnnn - 10 or 8 digit number of employee identifier (RFID proximity tag: a pendant or a card)

recorderID - identifier of recorder, max. 20 alphanumeric characters

number - the increasing number of the image, concerning particular registration

Data transfer and integration

Thanks for Linux operating system, there are many possibilities to transfer the data from the recorder to server. Recorder sends whole directory tree to the TAS using 'rsync' command via SSH tunnel when it is connected for the first time, and then it sends only the new data every minute (by default). If the SSH and rsync are not available, other file transfer options can be implemented, i.e. smb, ftp, nfs, sftp.

As the recorder operates on Linux based system, all the configuration details (data send interval, data format, file naming, data compression, data encryption, etc) can be easily changed and adjusted, to fit the needs of the User.

Configuration

Terminal is run on Raspbian OS, that is a version of the Debian Linux distribution. Configuration of the recorder is done by editing few files. You need to know the IP address of the terminal. To connect to the recorder, you need an application that enables SSH connections, i.e. putty. You can configure the recorder in your office or on the site, after installing it.

To locate the recorder use a software application RCPlusLoc (you can download it from our website). When you run it, you can check the IP address of the recorder. Default address is 192.168.0.99.

Run your SSH application and connect to the recorder, using the obtained IP address, port 22.

Login as 'admin', password 'rcplus#admin'. You are presented with a prompt `admin@rcplus:/#`

Files used for configuration are as follows:

`/etc/hostname`

– file storing recorder name used i.e. for prompt, default value is 'rcplus'.

`/usr/local/rcp/uvc.conf`

– config file for the uvc process, you can change the following variables:

- 'reader_id=rcplus' - is used as a variable for names of created files; change the value to what you want, max length is 20 chars, only use Latin chars and digits
- 'pic_per_event=2' - number of photos taken per one event, max value is 5 (due to practical reasons)
- 'working_dir=/workdir' - path and name of the directory used to store all the files; change the value to what you want

`/usr/local/rcp/synchro`

– configuration file for the synchronization of the data files stored in recorder with TAS, if default data-send procedure is used.

- 'employees' – name of the file providing the *user_ID* <-> *name* relation, described below
- 'root@192.168.0.2:/var/www/test/' – address of the Time Attendance Server (TAS) with destination path for the data files to be copied, if default data-send procedure is used.

`/usr/local/rcp/clean_dir_1`

- procedure used to remove old subdirectories.

- 'SUBDIR_LIMIT=32' – max number of directories in the `/workdir` directory, limit can be changed

NOTE: take into consideration
free space on the Recorder

`/workdir/employees`

- file storing the *user_IDs* and users' names, used to display on the recorder display the name of the user performing an action (in/out), max name string length is 16 chars, only use Latin chars and digits.

Sending data to the TAS by default is managed with 'rsync' application, based on the entry in cron daemon configuration (data-send is done every 2 minutes by default).

Camera configuration is stored in `/usr/local/rcp/pob.sh` file, documentation of the camera is available at the RaspberryPi website

<https://www.raspberrypi.org/documentation/raspbian/applications/camera.md>