Teldat Router

FTP Protocol

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Chapter 1
Introduction

1. FTP Protocol

One of the most important alternatives permitted through Internet is the transfer of files from one terminal to another from anywhere in the world. In order to achieve this we use the File Transfer Protocol, FTP:

If we have access to remote files via Telnet, through FTP, we can share (receive and send) our files with other devices provided this is permitted by the administrator of the said devices.

The objectives of FTP are:

1.- To promote the sharing of files (programs or data).

2.- Promote the use of remote hosts.

3.- Protect the user from the variations in the file storage systems of the distinct hosts.

4.- To carry out data transfer efficiently and safely.

The FTP server for our devices allows you to carry out remote downloading of code as well as configurations from FTP clients in remote terminals. This makes it unnecessary to have the devices directly connected with our PC in order to load the code or a determined configuration.

2. FTP Model

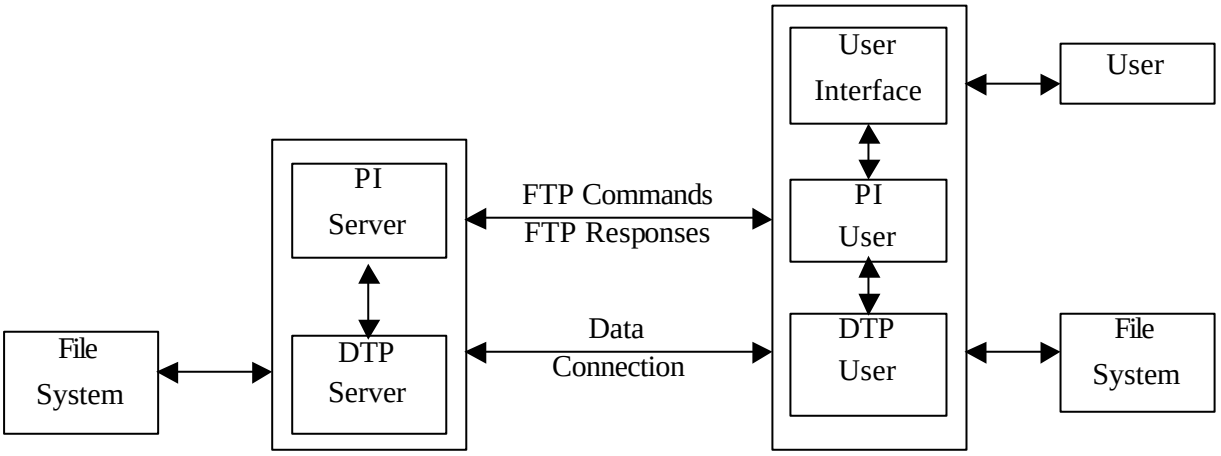
We have two types of connections in an FTP session:

Control connection: this is established between the PI Server and PI User. Through this the FTP commands are sent by the PI User (client) and the replies by the PI Server. TCP/IP port 21 is used for this.

The FTP commands specify the type of operation you wish to carry out in the file system as well as the parameters needed for data connection.

The control connection must remain open while the data transfer is being carried out. Generally, it is the client who needs to request control connection closure once he has finished using the FTP service and the server who undertakes the task of closing.

Data connection: this is established between the DTP Server and the DTP User. The DTP User 'listens' at the default port (unless another one has been specified through the PORT command) and waits for the server to initialize data connection according to that specified through the connection control. An exchange of data in both directions is produced through the data connection between the DTP User and Server and at the same time, a communication between the DTP User and the IP User gives rise to the latter sending confirmation replies to the PI Server.



There can exist other situations however where the client wishes to transfer files between two host neither of which are local. In order to do this the client needs to create a control connection with each server and establish a data connection between the two. In this way, the control information is passed from the client to the PI User, but the data is transferred between the two servers' DTPs.

Our FTP server supports this case.

3. Implementation

The implemented server fully supports RFCs 959, 1123, 2389 and 2428, with the following modifications:

Not supported:

Command	Response
ALLO (temporary storage reserve)	Superfluous
TYPE A C (Type ASCII Carriage)	Not supported
TYPE E (Type EBCDIC)	Not supported
TYPE E N (Type EBCDIC Non Print)	Not supported
TYPE E C (Type EBCDIC Carriage)	Not supported
TYPE E T (Type EBCDIC Telnet)	Not supported
STRU P (Struct Page)	Not supported
MKD (create new directory)	Not supported
RMD (delete new directory)	Not supported
STOU (store unique)	Not supported

Changed:

ACCT: This is used to activate the server TEST accounts or modes.

SMNT: This serves to activate the file system to be used by the server. You need to name the file system.

CDUP: Changes the work directory to the current root directory. This can now only be used in order to deal with the file systems implemented as directories in the server.

CWD: Changes the work directory to the directory indicated by the parameter. Now this can only be used to handle the file systems as directories. It also admits '..' or '/' to go up to the root directory.

REST: this is not valid in some file systems. It is also admitted for stream mode.

APPE: this is not valid in some file systems.

TYPE LOCAL: Supports LOCAL 8 only, considered as IMAGE.

TYPE A T : supported as TYPE A N.

This also complies with part of the RFC 2577 recommendations.

Together with these RFCs, the server also implements the following non-standard commands:

SITE Command: gathers the following services:

SITE CLEARBUFFER		Clears the temporary buffer memory.
SITE COMPATIBLE	OFF	Selects the operation in Extended mode.
SITE COMPATIBLE	ON	Selects the operation in Compatible mode with the old versions.
SITE DIRECT	OFF	Ensures that the server operates in secure mode for teleloading. When the STOR command is executed, the file is saved in the temporary memory buffer. To save this in the active file system during this session, you need to use the SITE SAVEBUFFER command.
SITE DIRECT	ON	The server operates in a normal mode, saving the file received in the active file system during this session.
SITE IMMEDIATE	OFF	Selects data reception through TCP based on indications queue.
SITE IMMEDIATE	ON	Selects data reception through TCP based on direct indications.
SITE KEEPALIVE	OFF	Deactivates the Keepalives in the data link.
SITE KEEPALIVE	ON	Activates the Keepalives in the data link.
SITE RELOAD	OFF	Deactivates the device's RESET command on ending the FTP session.
SITE RELOAD	ON	Provokes a complete device RESET on ending the FTP session.
SITE REPLY	OFF	Deactivates the sending of 119 responses in SAVEBUFFER. Deactivates the sending of 119 responses in SAVESLAVES.
SITE REPLY	ON	Activates the sending of 119 responses in SAVEBUFFER. Activates the sending of 119 responses in SAVESLAVES.
SITE STATBUFFER		Displays the temporary buffer occupation status.
SITE STOREDEVICE		Indicates and displays the permanent storage device.
SITE SAVEBUFER		Dumps the memory buffer content into the permanent storage device. This command must be sent when a file you wish to save is sent to the device. The STOR command does not save in the permanent storage device for security reasons when operating in a secure mode. Also admits the name of one of the existing file systems as an optional parameter when the COMPATIBLE feature is deactivated.

SITE SAVESLAVES		Dumps the memory buffer content over the slave devices associated to this device. This command needs to be sent when a file has been transmitted to the device. Permits you to use the device as a bridge to teleload devices that are not visible from the teleloading center. Only certain devices have this feature consequently it may not be present.
SITE SYSTMODE MSDOS		Indicates to the server that the directory lists are given with an MS-DOS format. When it receives the SYST command, the MS-DOS name is returned.
SITE SYSTMODE UNIX		Indicates to the server that the directory lists are given with a UNIX format. When it receives the SYST command, the UNIX name is returned.

SIZE Command: Non-standard command which returns the file size. The parameter is the file name.

MDTM Command: Non-standard command which returns the date and time of a file modification. The parameter is the file name.

The **file systems** or storage systems implemented in the FTP server are:

BIO: This handles the device BIOS zone. Only the BIOS code files are saved here, if the system detects that this is a non-valid BIOS code, the recording is not permitted. This is present in devices with BIOS teleloading features.

DSK: handles the disk. The code files and configuration are stored here. Present in devices with disk drive, RAM disk or FLASH disk.

FDA: handles the data Flash memory. The configuration files are stored here. Present in all devices with FLASH without FLASH disk feature.

FCO: handles the code Flash memory. The code file is stored here. Present in devices without a disk unit with FLASH without FLASH disk feature.

MEM: handles the temporary buffer. Exists in all devices.

TS1: this is used to check that the FTP is operating. Present in all devices.

TST: checks that the FTP is operating correctly. Exists in all devices.

NUL: used as a default file system when a system has not been loaded. Exists in all devices.

SMC: this manages the Smart Memory Card. This is only present in devices which have this storage unit.

The FTP server is capable maintaining simultaneous connections to various clients. The number of clients is configurable and limited. However, it can only maintain simultaneous traffic for those clients who are accessing distinct file systems.

On executing the **SITE SAVEBUFFER** command, it is the current memory buffer content that is recorded in the storage device. You need to bear in mind that the following situation can arise:

User 1 executes the STOR command. Once this has finalized, the buffer is released. At this point User 2 enters and before User 1 has been able to execute the SITE SAVEBUFFER command, User 2

has modified the buffer content. When User 1 executes the SITE SAVEBUFFER command, it is the current memory buffer (modified by User 2) which is stored and not the one required by User 1.

The **SAVEBUFFER** command when it successfully finishes executing, if the connection is in COMPATIBLE ON mode and only 1 simultaneous client is permitted, deletes the memory buffer. This must be taken into account when using the **SAVESLAVES** command to sent the slave or subordinate devices content in addition to loading this in the device. In this case, you need to first use the **SAVESLAVES** command and subsequently **SAVEBUFFER**, or use the **SITE COMPATIBLE OFF** command.

4. Commands and Responses

The commands implemented in the FTP server are the following:

4.1. Commands accepted for all user types

Command **Open FTP Connection** :(This is a TCP command, not FTP).

This is the procedure connecting to the device's FTP server through TCP/IP.

In the response, the device indicates the number of connected clients and the maximum number of permitted clients allowed with simultaneous connection.

Responses:

220 FTP server ready, %ld active clients of %ld simultaneous clients allowed.

Command **ACCT**:

Account Information. This command operates when a user has carried out a login process and is used to activate a transfer mode to carry out tests so that disasters are avoided. This mode blocks the server and only permits transfers to and from the Test directories. In these transfers, the files names are admitted as numbers so as many octets as indicated by the figure specified in the file name are sent. The following commands are admitted:

ACCT TEST0	Activates test mode over the /TST directory
ACCT TEST1	Activates test mode over the /TS1 directory

Responses:

450 Error, system busy.

200 FTP server test account enabled.

202 Command superfluous at this site.

Command **QUIT**:

Terminates and closes the FTP session

Responses:

221 Goodbye.

Command **REIN**:

Restarts the FTP session (Only if User Logout is executed)

Responses:

450 Error, system busy.

220 OK.

Command **NOOP**:

No operation (Only replies with O.K.)

Responses:

450 Error, system busy.

200 OK.

Command **SYST**:

Responds with the name of the operating system. In this case, it serves to indicate the directory format to the client. For device disk control effects, this can be either UNIX or MS-DOS. This name is obtained from the RFC 1700 OPERATING SYSTEMS NAMES section.

Responses:

450 Error, system busy.

215 MSDOS system type.

215 UNIX system type.

Command **HELP**:

Responds with the general help message or help for a specific command. The response depends on the argument.

Responses:

450 Error, system busy.

214 HELP: Command not recognized

214 HELP: Command recognized but not implemented

214 HELP: To see ...

214 LIST: Syntax: LIST[<path-name>]<CRLF>...

Command **USER**:

Identifies the user at LOGIN. The user name is the parameter. The following commands are admitted if the access control system to the device is not active:

USER ANONYMOUS	Login anonymous with viewer level.
USER FTP	Login anonymous with viewer level.
USER GUEST	Login anonymous with display level.
USER ROOT	Login Manager with ROOT or administrator level.

In cases where the device access control system through users is active, the command parameter will have to be a registered and active user.

Responses:

450 Error, system busy.

530 User name too long.

331 User name accepted, need password. (Login is correct, you must introduce a password to complete the operation)

Command **PASS**:

Checks the LOGIN password

Responses:

421 Service not available.

450 Error, system busy.

530 User login refused.

530 Password too long.

531 User name required.

230 User login successful.

230 User login complete.

Command **STAT**:

Indicates the server state

Responses:

211 Server Status: READY / BUSY

211 Direct mode : ON / OFF

211 Compatibility: ON / OFF

211 Immediate : ON / OFF

211 Keepalive : ON / OFF

211 Reply 119 : ON / OFF

211 Reload code : ON / OFF

211 Savebuffer : ON / OFF

Command **FEAT**:

RFC-2389 Returns a FEATURES list and extensions implemented in the server.

Responses:

450 Error, system busy.

211-Extensions supported:

MDTM

REST STREAM

SIZE

211 End

4.2. Commands only accepted for registered users

Command **PORT**:

Changes the defined default IP address and PORT. The parameters consist of 6 numbers separated by commas where the first 4 numbers indicate the network address and the last two the port number. Users with viewer level are not permitted to use network addresses which are different from that used to connect.

Responses:

450 Error, system busy.

411 Unable to get DTP

501 IP Address error.

501 IP Address delimiter error.

501 TCP port error.

501 TCP port delimiter error.

504 Command not implemented for that parameter.

504 IP Address not allowed.

530 Access denied, not logged in.

530 Only EPSV commands admitted.

200 PORT is set to IP ADDR = %d.%d.%d.%d PORT = %d

Command **PASV**:

Requests passive mode operation from the server for the data connection of the subsequent command. The response gives the IP address and the port number the server will use for the next command.

Responses:

450 Error, system busy.

411 Unable to get passive mode

530 Access denied, not logged in.

530 Only EPSV commands admitted.

227 Entering Passive Mode. (%d,%d,%d,%d,%d,%d)

Command **EPRT**:

Changes the IP address and PORT defined by default. The parameters consist of a series of delimiters separating the used protocol fields, IP address and the PORT. Users with viewer level are not permitted to use network addresses which are different from that used to connect.

Responses:

411 Unable to get DTP.

450 Error, system busy.

501 Bad first EPRT delimiter.

501 Bad Second EPRT delimiter.

501 Bad Third EPRT delimiter.

501 Bad Fourth EPRT delimiter.

501 IP address error.

501 IP address delimiter error.

501 TCP port value error.

504 Command not implemented for that parameter.

504 IP Address not allowed.

522 Protocol not supported, use (1,2).

530 Access denied, not logged in.

530 Only EPSV commands admitted.

200 Extended PORT is set to |1|%u.%u.%u.%u|%u|

200 Extended PORT is set to |2|%X:%X:%X:%X:%X:%X:%X:%X|%u|

Command **EPSV**:

This command requests the server to operate in an extended passive mode in the data connection for the next command. A parameter indicating the protocol to be used may come up. If it does and contains for example the word ALL, as of that moment the connection will reject any PORT, PASV and EPRT command.

Responses:

411 Unable to get extended passive mode

450 Error, system busy.

522 Protocol not supported, use (1,2)

530 Access denied, not logged in.

530 Only EPSV commands admitted.

200 Extended Passive ALL processed.

229 Entering Extended Passive Mode (|||%u|)

Command **TYPE**:

Defines the type of coding in the data link. The following types are acknowledged:

TYPE A N	TYPE ASCII NON PRINT. Used to transfer text files. 'N' is optional and may not exist.
TYPE A T	TYPE ASCII TELNET. Used to transfer text files (Not supported).
TYPE A C	TYPE ASCII CARRIAGE. Used to transfer text files (Not supported).
TYPE I	TYPE IMAGE. Used to transfer binary files.
TYPE E	TYPE EBCDIC. (Not supported).
TYPE L 8	TYPE LOCAL. Only LOCAL 8 = IMAGE supported.

Responses:

450 Error, system busy.

501 TYPE argument error.

501 TYPE format not recognized.

501 TYPE ASCII format error.

504 TYPE ASCII CARRIAGE not supported.

504 TYPE LOCAL size not supported.

504 TYPE EBCDIC not supported.

530 Access denied, not logged in.

200 TYPE is set to ASCII NON PRINT.

200 TYPE is set to ASCII TELNET.

200 TYPE is set to IMAGE.

200 TYPE is set to LOCAL 8.

Command **MODE**:

Defines the transfer mode. The following modes are acknowledged:

MODE S	Mode defined as STREAM.
MODE B	Mode defined as BLOCK
MODE C	Mode defined as COMPRESSED.

Responses:

450 Error, system busy.

501 MODE argument error.

501 MODE format not recognized.

504 MODE BLOCK not supported.

504 MODE COMPRESSED not supported.

530 Access denied, not logged in.

200 MODE is set to STREAM.

200 MODE is set to BLOCK.

200 MODE is set to COMPRESSED.

Command **STRU**:

Defines type of structure. The following structures are acknowledged:

STRU F	Structure defined as FILE.
STRU R	Structure defined as RECORD.
STRU P	(Not supported). Structure defined as PAGE.

Responses:

450 Error, system busy.

501 STRU argument error.

501 STRU format recognized.

504 STRU PAGE not supported.

504 STRU RECORD not supported.

530 Access denied, not logged in.

200 STRU is set to FILE.

200 STRU is set to RECORD.

Command **ABOR**:

Aborts current operation and closes the data link if necessary.

Responses:

Depends on the canceled command, some of these responses are shown below. If the server is executing a command at the time, it gives two responses. The first indicates that it is canceling the command and the second message confirms the ABOR command has been executed. If the server is in idle, only the second message is sent.

530 Access denied, not logged in.

(1 response)

426 Aborting RNFR command...

426 Aborting RNTO command...

426 Aborting DELE command...

426 Aborting LIST command...

426 Aborting NLST command...

426 Aborting RETR command...

426 Aborting STOR command...

426 Aborting APPE command...

426 Aborting MDTM command...

426 Aborting SIZE command...

426 Aborting SITE command...

(2 Responses)

226 Command ABOR successfully processed.

Command **LIST**:

Sends the active file system directory to the client through the data link. The file selection mask is admitted as the parameter.

Responses:

The directory is sent in text form with UNIX or MSDOS format (depending on the configuration) through the data link so it can be acknowledged and interpreted by the majority of the graphic clients. Each entry in the directory terminates with CR-LF.

The following responses can appear through the control link:

425 Error, DTP SCB not exists.
425 Unable to open data transport.
426 Unexpected data link close.
450 Error, system busy.
450 File system busy.
501 Pathname too long.
501 Invalid pathname.
530 Access denied, not logged in.
550 Error ending search.
550 Error closing device.
125 Data connection already open, list transfer in process... (Initial)
150 Data connection open, list transfer in process... (Initial)
225 List transfer completed, data connection is open. (Final)
226 List transfer completed, data connection is closed. (Final)

Command **NLST**:

Sends the list of file names and the active file system directory to the client through the data link. The file selection mask is admitted as the parameter.

Responses:

The list of names from the directory file separated by CR-LF is sent through the data link.

The following responses can appear through the control link:

425 Error, DTP SCB not exists.
425 Unable to open data transport.
426 Unexpected data link close.
450 Error, system busy.
450 File system busy.
501 Pathname too long.

501 Invalid pathname.
530 Access denied, not logged in.
550 Error ending search.
550 Error closing device.
125 Data connection already open, list transfer in process... (Initial)
150 Data connection open, list transfer in process... (Initial)
225 List transfer completed, data connection is open. (Final)
226 List transfer completed, data connection is closed. (Final)

Command **PWD**:

Command **XPWD**:

Sends the work directory name. The FTP server is only implemented to operate in the file systems root directory. This also indicates the file system used.

Responses:

450 Error, system busy.
530 Access denied, not logged in.
257 "/%s" is current directory.

Command **SMNT**:

Structure MouNT. Serves to activate the file system the server is going to use. You need to give the file system name as the argument.

Responses:

450 Error, system busy.

501 File system not recognized.
530 Access denied, not logged in.
550 File system is not available.
200 File system mounted.

Command **OPTS**:

RFC-2389 Negotiates the options of some the commands implemented in the server.

Responses:

450 Error, system busy.
501 No options available
530 Access denied, not logged in.

4.3. Commands accepted only for users with ROOT access level

Command **RETR**:

Sends the file to the client through the data link. The parameter indicates the file name in the current directory.

Responses:

The file is sent according to selected type, structure and mode (TYPE, STRU and MODE) through the data link.

The following responses can appear through the control link:

411 Unable to get DTP

425 Unable to open data transport.

426 Unexpected data link close.

450 Error, system busy.

450 File system busy.

501 Invalid filename.

501 Invalid pathname.

530 Access denied, not logged in.

550 Unable get file length.

550 Unable to open file.

550 Error reading file.

550 Error closing file.

550 Error closing device.

554 Unable to seek in file.

125 Data connection already open, file transfer in process... (Initial)

150 Data connection open, file transfer in process... (Initial)

225 RETR completed, %lu bytes processed, data connection is open. (Final)

226 RETR completed, %lu bytes processed, data connection is closed. (Final)

Command **STOR**:

Receives a file from the client, overwriting if it already exists in the active file system. The parameter indicates the file name. If the server is operating in a secure mode, the file is written in the temporary memory buffer instead of the active file system. This means that should there be any problems in the transmission, the files being sent do not destroy those already existing. This could be disastrous where a failed program is teleloaded and then the device resets as the latter would then be unable to restart by itself.

Responses:

The file is received according to selected type, structure and mode (TYPE, STRU and MODE) through the data link.

The following responses can appear through the control link:

411 Unable to get DTP

425 Unable to open data transport.

426 Unexpected data link close.

450 Error, system busy.

450 File system busy.

501 Invalid filename.

501 Invalid pathname.

530 Access denied, not logged in.

530 Alternate file system not loaded.

550 Files .cfg .x and .xz only.

550 Unable get file length.

550 Unable to open file.

550 Error writing file.

550 Error closing file.

550 Error closing device.

554 Unable to seek in file.

110 MARK %s = %lu (Intermediate possible in MODE BLOCK)

125 Data connection already open, file transfer in process... (Initial)

150 Data connection open, file transfer in process... (Initial)

225 STOR completed, %lu bytes processed, data connection is open. (Final)

226 STOR completed, %lu bytes processed, data connection is closed. (Final)

Command **APPE**:

Receives a file from the client.

If the server is operating in secure mode, the data received is added at the end of the temporary buffer content. Should this be empty, this command behaves as a STOR command.

If the server is not operating in a secure mode and the files do not exist, this command behaves as the STOR command.

If the server is not operating in a secure mode and the file already exists, the data received is simply added to the end of this.

Responses:

The file is received according to selected type, structure and mode (TYPE, STRU and MODE) through the data link.

The following responses can appear through the control link:

411 Unable to get DTP

425 Unable to open data transport.

426 Unexpected data link close.

450 Error, system busy.

450 File system busy.

501 Invalid filename.

501 Invalid pathname.

530 Access denied, not logged in.

550 Unable get file length.

550 Unable to open file.

550 Error writing file.

550 Error closing file.

550 Error closing device.

554 Unable to seek in file.

110 MARK %s = %lu (execution possible in MODE BLOCK)

125 Data connection already open, file transfer in process... (Initial)

150 Data connection open, file transfer in process... (Initial)

225 APPE completed, %lu bytes processed, data connection is open. (Final)

226 APPE completed, %lu bytes processed, data connection is closed. (Final)

Command **ALLO**:

(Not supported). Temporary storing reserve.

Responses:

450 Error, system busy.

530 Access denied, not logged in.

202 Command not implemented, superfluous at this site.

Command **DELE**:

Deletes a file from the disk if the unit is operative. The parameter is the file name.

Responses:

450 Error, system busy.

411 Unable to get DTP

450 File system busy.

501 Invalid filename.

530 Access denied, not logged in.

550 Unable to delete file.

550 Error closing device.

250 File deleted.

Command **RNFR**:

Permits you to rename a file from the disk. The parameter is the current name. Through this command you can store the current file name. To rename this you must send it after the RNTO command.

Responses:

450 Error, system busy.

411 Unable to get DTP

450 File system busy.

501 Invalid filename.

530 Access denied, not logged in.

550 File not found.

550 Error ending search.

550 Error closing device.

350 Rename pending further information.

Command **RNTO**:

Permits you to rename a file in the disk. The parameter is the new file name. In order to carry this out you need to have previously received an RNFR command.

Responses:

450 Error, system busy.

450 File system busy.

501 Invalid filename.

503 Bad sequence of commands RNFR and RNTO.

530 Access denied, not logged in.

550 Unable to rename file.

550 Error closing device.

250 File successfully renamed.

Command **SITE**:

Command that groups a set of non-standard commands acknowledged by the server at this SITE. Admits commands from section 3.

Responses:

411 Unable to get DTP for SAVEBUFFER

450 Error, system busy.

450 File system not available.

450 Error opening File System.

500 SITE command not recognized.

500 SITE COMPATIBLE mode not recognized.

500 SITE DIRECT mode not recognized.

500 SITE IMMEDIATE mode not recognized.

500 SITE KEEPALIVE mode not recognized.

500 SITE RELOAD mode not recognized.

500 SITE REPLY mode not recognized.

500 SITE SYSTMODE mode not recognized.

500 DTP cannot process this SITE command.

501 File system not recognized.

503 No Temporal buffer present.

503 Temporal buffer is locked.

503 Temporal buffer is already locked.

503 Temporal buffer is empty.

503 Target file system not supports SAVEBUFFER.

503 Application code not supported by present BIOS.

504 Feature not present.

530 Access denied, not logged in.

550 Files .cfg .x and .xz only.

550 Unable to open file.

550 Unable to write file.

550 Error closing file.

550 Error closing device.

550 File system is not available.

552 Error saving slaves.

552 Not enough space to save file.

119 Saving temporal buffer...

119 Saving temporal buffer over slave devices…

200 COMPATIBLE mode is set to %s

200 DIRECT is set to %s.

200 IMMEDIATE mode is set to %s.

200 KEEPALIVE mode is set to %s.

200 RELOAD mode is set to %s.

200 REPLY mode is set to %s.

200 SYST is set to %s.

200 SAVEBUFFER ordered. Please, close connection to proceed.

200 SAVEBUFFER completed O.K.

200 SAVESLAVES completed O.K.

211 Temporal buffer cleared and deallocated.

211 %s: is permanent storage device, savemode is %s.

211 Buffer status: MAX-REQ-BUSY %lu-%lu-%lu filename: "%s.%s".

Command **CDUP**:

Command **XCUP**:

Changes the work directory to the current root directory.

This now only serves to use the file systems as directories.

Responses:

450 Error, system busy.

550 Top of tree.

530 Access denied, not logged in.

200 CDUP command successful.

Command **CWD**:

Command **XCWD**:

Changes the work directory to the directory indicated by the parameter.

This now only serves to use the file systems as directories. It also admits '…' or '/' to go up the root directory.

Responses:

450 Error, system busy.

501 No pathname defined.

501 Invalid pathname.

550 Pathname not available.

200 CWD current dir successful.

200 CWD root dir successful.

200 CWD Command successful.

Command **MKD**:

Command **XMKD**:

(Not supported). Creates a new directory in the disk with the name is indicated in the parameter.

Responses:

450 Error, system busy.

502 Command not implemented.

530 Access denied, not logged in.

Command **RMD**:

Command **XRMD**:

(Not supported). Deletes a directory from the disk. The name is indicated by the parameter.

Responses:

450 Error, system busy.

502 Command not implemented.

530 Access denied, not logged in.

Command **REST**:

Permits you to reestablish a file transfer if the file system permits this.

Responses:

450 Error, system busy.

530 Access denied, not logged in.

200 Restore offset set to 0."

350 Restore offset set to %lu, use RETR, STOR or APPE to init transfer.

Command **STOU**:

(Not supported). STOre Unique, this behaves as the STOR command but does not send the file name. The device assigns a unique name to the file.

Responses:

450 Error, system busy.

502 Command not implemented.

530 Access denied, not logged in.

Command **MDTM**:

Non-standard command which returns the date and the time for a file modification. The parameter is the file name.

Responses:

450 Error, system busy.

411 Unable to get DTP.

450 File system busy.

501 Invalid filename.

530 Access denied, not logged in.
550 File not found.
550 Error ending search.
550 Error closing device.
213 YYYYMMDDHHMMSS

Command **SIZE**:

Non-standard command which returns the file length. The parameter is the file name.

Responses:

450 Error, system busy.
411 Unable to get DTP
450 File system busy.
501 Invalid filename.
530 Access denied, not logged in.
550 File not found.
550 Error ending search.
550 Error closing device.
213 nnnnnnnnn

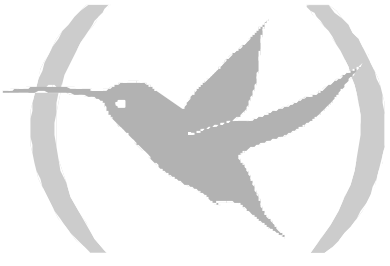
Possible new commands:

Not implemented.

Responses:

450 Error, system busy.
500 DTP cannot process this command.
502 Command not implemented.
503 Unexpected data connection indication.
530 Access denied, not logged in.

Chapter 2
Configuration



1. Configuration Commands

This section describes the commands to configure the FTP protocol. To access the FTP protocol configuration environment, enter the following commands:

```
*P 4

Config> SET FTP
-- FTP user configuration --
FTP config> ?
```

The following table is a summary of the FTP protocol configuration commands.

Command	Function
? (HELP)	Lists the commands or their options.
CLIENTS	Establishes the maximum number of simultaneously connected clients.
COMPATIBILITY	Selects Compatible mode operation with old versions.
CONTROL-PORT	Configures the FTP session control TCP port.
DATA-PORT	Configures the data transfer TCP port.
DEFAULT	Deletes the current configuration and restores the default configuration.
DIRECT	Selects normal mode operation saving the file received in the files system activated for this session.
IMMEDIATE	Selects reception via TCP for data using direct indications.
KEEPALIVE	Activates the keepalive in the data link.
LIST	Lists the FTP configuration.
MSS	Configures the maximum TCP segment size.
NO	Disables the distinct FTP possibilities.
OS	Determines the format the server uses when returning the file name on executing the **LIST** command.
PRIORITY	Establishes the FTP tasks priority.
REPLY	Activates reply sending when a command is slow to execute.
RX_BUFF	Configures the sizes of the buffers used for reception of TCP from DTP.
SYST	Specifies the files system to activate by default.
TEMP_BUFF	Configures the size of the temporary buffers.
TIMER	Configures the idle timer.
TX_BUFF	Configures the sizes of the buffers used for transmission of TCP from DTP.
EXIT	Returns to the previous prompt.

1.1. ? (HELP)

By entering **?** all the available commands are displayed. You can also use the **?** symbol to view the various options of each command.

Syntax:

```
FTP config> ?
```

Example:

```
FTP config> ?
CLIENTS            Sets the maximum number that can be simultaneously connected
COMPATIBILITY      Compatible mode operation for older versions
CONTROL-PORT       Configures the FTP session control TCP port
DATA-PORT          Configures the data transfer TCP port
DEFAULT            Sets default configuration
DIRECT             Saves the received file in the active file system
IMMEDIATE          Selects Rx data by the TCP based on direct indications
KEEPALIVE          Activates the keepalive in the data link
LIST               Lists current configuration
MSS                Configures the maximum TCP segment size
NO                 Disables the FTP server capabilities
OS                 Determines the format used by the server
PRIORITY           Establishes the FTP task priority
REPLY              Activates the sending of replies when there are delays
RX_BUFF            Sets the size of the buffers used to receive TCP from DTP
SYST               Specifies the file system to activate by default
TEMP_BUFF          Configures the temporary buffer size
TIMER              Configures the inactivity timer
TX_BUFF            Sets the size of the buffers used to receive TCP from DTP
EXIT
```

1.2. CLIENTS

Establishes the maximum number of clients that can be simultaneously connected to the FTP server.

Syntax:

```
FTP config> CLIENTS
```

Example:

```
FTP config> CLIENTS
Max. number of clients simultaneously [1]?
FTP config>
```

1.3. COMPATIBILITY

This option selects the Compatible mode operation for older versions. With this feature activated, the server is capable of selecting the adequate storing system in order to record the code received through the SITE SAVEBUFFER command. This can also check if the received code is compatible with the BIOS present in the device in cases where the device has a BIOS teleloading feature. This also provokes deletion of a temporary buffer once the SITE SAVEBUFFER is executed when only one simultaneous client is permitted.

Syntax:

```
FTP config> COMPATIBILITY
```

Example:

```
FTP config> COMPATIBILITY
FTP config>
```

1.4. CONTROL-PORT

Configures the FTP session control TCP port. By default, Port 21.

Syntax:

```
FTP config> CONTROL-PORT
```

Example:

```
FTP config> CONTROL-PORT
Control port (0 = default)[21]? 21
FTP config>
```

1.5. DATA-PORT

Configures the data transfer TCP port. By default, Port 20.

Syntax:

```
FTP config> DATA-PORT
```

Example:

```
FTP config> DATA-PORT
Data port (0 = default)[20]? 20
FTP config>
```

1.6. DEFAULT

This command permits you to delete the current configuration and to restore the default configuration.

Syntax:

```
FTP config> DEFAULT
```

Example:

```
FTP config> DEFAULT
FTP config>
```

1.7. DIRECT

This option selects a normal operating mode saving the received file in the active file system during this session. Please note, that this feature serves to operate in emergency cases such as conditions of scant free memory. Some devices do not admit this operation mode in the FCO storing system due to the fact that the code is executed from the flash memory itself. This feature ignores some server protections when recording the code in the storage systems and the code loading is not secure. This can occur in cases of unexpected disconnection when the sent code is not completed and can leave the device inoperable. Use with extreme caution or under the supervision of TELDAT personnel.

Syntax:

```
FTP config> DIRECT
```

Example:

```
FTP config> DIRECT
FTP config>
```

1.8. IMMEDIATE

This option selects data reception by the TCP based on direct indications.

Syntax:

```
FTP config> IMMEDIATE
```

Example:

```
FTP config> IMMEDIATE
FTP config>
```

1.9. KEEPALIVE

This option activates the keepalive in the data link.

Syntax:

```
FTP config> KEEPALIVE
```

Example:

```
FTP config> KEEPALIVE
FTP config>
```

1.10. LIST

The **LIST** command is used to display the content of the FTP configuration.

Syntax:

```
FTP config> LIST
```

List corresponding to the default configuration:

Example:

```
FTP config> LIST
FTP configuration:
Operating System:             UNIX
Default File System:          NUL
Control port:                 21
Data port:                    20
Inactivity timer:             360 seconds
Number of clients:            1
Priority:                     0
Maximum Segment Size:         1024
Transmission Buffer Size:     2048
Reception Buffer Size:        16384
Temporal Buffer Size:         0
Reply:                        DISABLE
Keepalive:                    DISABLE
Immediate:                    ENABLE
Compatibility:                ENABLE
Direct:                       DISABLE
FTP config>
```

1.11. MSS

Configures the maximum TCP segment size.

Syntax:

```
FTP config> MSS
```

Example:

```
FTP config> MSS
Maximum Segment Size[1024]?
FTP config>
```

1.12. NO

This command is used to disable the FTP server capabilities.

Syntax:

```
FTP config> NO ?
REPLY
KEEPALIVE
IMMEDIATE
COMPATIBILITY
DIRECT
```

a) NO REPLY

Deactivates the 119 reply send in the SAVEBUFFER.

Example:

```
FTP config> NO REPLY
FTP config>
```

b) NO KEEPALIVE

Deactivates the keepalive in the data link.

Example:

```
FTP config> NO KEEPALIVE
FTP config>
```

c) NO IMMEDIATE

This option selects data reception by the TCP based on queue indications.

Example:

```
FTP config> NO IMMEDIATE
FTP config>
```

d) NO COMPATIBILITY

This option selects Extended mode operation. Please note that deactivating this compatible feature means that the server cannot activate the compatible code check with present BIOS, which is carried out in devices that have the teleloading BIOS facility. Nor does it check or automatically select the storage system in order to record the code through the SITE SAVEBUFFER command. This means that it is necessary to make sure that the selected system is the active system. This also deactivates the deletion of the temporary buffer once the SITE SAVEBUFFER command is executed.

Example:

```
FTP config> NO COMPATIBILITY
FTP config>
```

e) NO DIRECT

This option ensures that the server operates in secure mode during teleloading. When the STOR command is executed, the file is saved in the temporary memory buffer. In order to save the file in the active file system during this session, you must use the SITE SAVEBUFFER command.

Example:

```
FTP config> NO DIRECT
FTP config>
```

1.13. OS

Permits you to determine the format used by the server when the file name is returned on executing the LIST command. This is equivalent to the SITE SYSTMODE MSDOS and SITE SYSTMODE UNIX commands except these on execution are not reflected in the configuration and the specified format is only valid for the established session.

Syntax:

```
FTP config> OS ?
MS-DOS
UNIX
```

Example:

```
FTP config> OS UNIX
FTP config>
```

1.14. PRIORITY

Establishes the FTP task priority. If the value is set to 0, the priority is the same as given for the TCP tasks.

Syntax:

```
FTP config> PRIORITY
```

Example:

```
FTP config> PRIORITY
Priority[0]?
FTP config>
```

1.15. REPLY

Activates the sending of replies when there are delays in the command execution. Sending a reply with 1xx indicates that the command is in progress. A subsequent reply of 2xx or 5xx indicates if the command has executed successfully or not. However this can cause problems with certain clients when the response “in progress” is taken as “successfully executed”.

In our server, the 119 reply send is activated in the SAVEBUFFER.

Syntax:

```
FTP config> REPLY
```

Example:

```
FTP config> REPLY
FTP config>
```

1.16. RX_BUFF

Configures the size of the buffers used to receive TCP from DTP.

Syntax:

```
FTP config> RX_BUF
```

Example:

```
FTP config> RX_BUF
Rx buffers size[2048]?
FTP config>
```

1.17. SYST

Specifies the file system to activate by default.

Syntax:

```
FTP config> SYST ?
BIO      Handles the BIOS zone. Only the BIOS code files are saved here
DSK      Handles the disk. The code and configurations are stored here
FCO      Handles the code Flash memory
FDA      Handles the data Flash memory
MEM      Temporary buffer
NUL      Default file system when a system has not been loaded
SMC      Handles the Smart Memory Card
TST      Checks that the FTP is operating correctly
```

Example:

```
FTP config> SYST MEM
FTP config>
```

1.18. TEMP_BUFF

Configures the temporary buffer size.

Syntax:

```
FTP config> TEMP_BUF
```

Example:

```
FTP config> TEMP_BUF
Temporal buffer size[0]?
FTP config>
```

1.19. TIMER

Configures the inactivity timer. Establishes a period of time after which, if no activity is detected, it disconnects.

Syntax:

```
FTP config> TIMER
```

Example:

```
FTP config> TIMER
Inact. Time (in seconds)[300]?
FTP config>
```

1.20. TX_BUFF

Configures the size of the buffers used to transmit TCP from DTP.

Syntax:

```
FTP config> TX_BUF
```

Example:

```
FTP config> TX_BUF
Tx buffers size[16384]?
FTP config>
```

1.21. EXIT

Use this command to return to the previous prompt.

Syntax:

```
FTP config> EXIT
```

Example:

```
FTP config> EXIT
Config>
```

1.22. SHOW CONFIG

Below you can see an example of a configuration presented through the **SHOW CONFIG** command. In this particular example default values have not been used so that all the configurable parameters appear.

Example:

```
FTP config> SHOW CONFIG
; Showing Menu and Submenus Configuration ...
; Router ATLAS 2 8 Version 10.0.0

   no immediate
   no compatibility
   reply
   keepalive
   direct
   os ms-dos
   syst smc
   control-port 22
   data-port 21
   timer 400
   clients 2
   priority 1
   mss 2000
   rx_buff 4096
   tx_buff 2048
   temp_buff 1024
FTP config>LIST
FTP configuration:
Operating System:         MS-DOS.
Default File System:      SMC.
Control port:             22
Data port:                21
Inactivity timer:         400 seconds
Number of clients:        2
Priority:                 1
Maximum Segment Size:     2000
Reception Buffer Size:    4096
Transmission Buffer Size: 2048
```

```
Temporal Buffer Size:     1024
Reply:                    ENABLE.
Keepalive:                ENABLE.
Immediate:                DISABLE.
Compatibility:            DISABLE.
Direct:                   ENABLE.
FTP Config>
```