Gemini-II web interface

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1. Introduction

Gemini's internal web server accesses files on the SD card. Only very few pages, like an initial index.htm and error pages are held in the code. This gives the user the possibility to customize the web interface at will. He can put static files on the SD card (HTML, JPEG, PNG, ...) if the browser can interpret them correctly.

Important to find the files is their location. Currently Gemini's web server supports three languages: English, German and French. For these languages, directories EN, DE and FR exists on the SD card, which contain the web pages in the respective languages.

Whenever a web page is requested, the web server examines the language code in the HTTP header the browser sent according to its setup, changes to the directory (or defaults to EN if the language is not (yet) supported and tries to open the file. If this is successful and the file name extension does not mark it as a dynamic html file, the file content is transmitted to the browser.

All commands and parameters described below are case sensitive!

2. Dynamic .cgi files

2.1. Format description

These files are analyzed and interpreted line by line. A line must not exceed 120 characters.

Each line starts with a character describing how to to interpret it:

'#'   A hash mark tells the interpreter to ignore this line

't'   Text. The line will be sent to the browser without any changes

'i'   This line will be replaced by the file with the given name included,

'c'   This line will be interpreted, the output will be dynamically build.

'.'   End of file.

Lines starting with the character 'c' will have some more characters following determining how to interpret them. The second character will be ignored, the third character will be used for the first and most important selection. Depending on this, the fifth character may be used as a secondary choice.

Dynamic files are examined and the returned content is generated at runtime. If you don't want to build your own .cgi-file, there's a dummy file "command.cgi" included in the Gemini firmware image, that allows to work with the parameters given below.

2.2 cgi file parameter list

'a'   Network parameters

                i   current IP address

                m   current netmask

                g   current default gateway

                p   current primary DNS server

                q   current secondary DNS server

	I	static IP address
	M	static netmask
	G	static default gateway
	P	static primary DNS server
	Q	static secondary DNS server
	T	DHCP timeout span

'A'   A/D (battery, 12V, Feature port)

    1

    ..

    6

'b'   Default Boot mode

    0

    ..

    3

'B'   Preferred Browser language

'C'   Coordinates

	p	current PRA position
	q	current DEC position
	r	current apparent RA position
	d	current apparent DEC position
	i	current telescopic RA position
	j	current telescopic DEC position
	R	target RA position

	D	target DEC position
	a	current Az position
	e	current El position
	A	target Az position
	E	target El position
	n	target name
	s	apparent target TRA position
	t	apparent target TDEC position
	h	telescopic target TRA position
	m	telescopic target TDEC position
	u	difference target RA - telescope RA
	v	difference target DEC - telescope DEC
	U	difference unmodelled target RA - telescope RA
	V	difference unmodelled target DEC - telescope DEC
	S	Serial Emulator output string
'c'	TCP status	
'D'	Databases	
	D	name of current directory
	d	complete directory
	f	catalog files directory
	F	catalogue files
	t	catalogue content
	S	object selection
	s	flash chip selection

i   object info (state.cgi)

'd'   System password - file 'system.cgi'

'E'   Motor encoder resolution

       R

       D

'e'   Encoder Port Usage

'F'   Firmware

       f   SD card label

       i   current firmware info

       B   firmware .bin file names

       b   firmware .bin file directory entries

       s   board serial #

'g'   Graphic HC brightness

'G'   Graphic HC color scheme

'h'   HC mode

       0   Visual Mode

       1   Photo Mode

       2   All Speeds Mode

'I'   Information

   'I' Information Buffer Content

   'H' Hand Controller Display

'S' Serial emulation return string

'i'   returns currently selected site (1..4)

'L'   Safety Limits in steps

          r   right

          l   left

          g   Western GoTo Limit

          t   Time to western limit

'l'   Browser Language - file 'language.cgi'

'M'   Gearing:

          W   RA worm ratio

          w   DEC ...

          S   RA spur ratio

          s   DEC ...

          R   RA motor nominal encoder resolution

          r   DEC

          A   RA step size   (floating point)

          a   DEC ...

          T   DEC TVC step count

'm'   mount type

          0

          ..

          6

'n'   tracking rate selection

          0   Sidereal

	1	King
	2	Lunar
	3	Solar
	4	Terrestrial
	5	Closed Loop
	6	Comet/User Defined

'O'   Object

       'n'   name of selected object or "---"

'Q'   Number of currently selected telescope pointing model

'P'   Model parameters

	E	Alignment count in the East
	W	... West
	a	Azimuth
	e	Elevation
	c	Non-Polarity at the Meridian
	n	Non-Polarity at the Pole
	h	Index error in HA
	d	Index error in DEC
	t	Tube Flexure
	C	Counterweight flexure
	F	Flip in RA
	f	Flip in DEC
	0..1	currently selected model
	s	swap :CM# and :Cm#

'p'   serial port setings - file 'serial.cgi

'q'   GPS port

'

'S'   Safety Limits in degrees/minutes

          r   right

          l   left

          g   WestGoToLimit

's'   Site Settings

          n   name of site

          t   timezone

          o   longitude

          a   latitude

          e   elevation

          #   site number

'T'   time:

          U   UTC date

          u   UTC time

          C   Civil Date

          c   Civil time

          s   Sidereal time

          m   Julian Date   (floating poit)

't'   moving mode

          x   RA axis state, f.i. currently active tracking rate

(sidereal, solar, lunar, terrestrial, comet, ...),

Slewing, No Motion, Centering, Guiding, STALL
(language-dependend string)

      y   DEC axis state...

'V'   Velocities:

S	Manual Slewing RA
s	Manual Slewing DEC
M	Move Speed RA
m	Move Speed DEC
T	GoTo Slewing RA
t	GoTo Slewing DEC
A	Slewing Acceleration RA
a	Slewing Acceleration DEC
C	Centering RA
c	Centering DEC
G	Guiding RA
g	Guiding DEC

'z'   State   (may be expanded later, please test single bits)

0	currently waiting for startup mode selection
1	Gemini started up

2.3 Serial Port Emulator

This emulator bridges the gap between the HTTP-based web interface and the serial command.

Commands sent as string value of the SE= parameter are executed by the serial command interpreter. It is possible to send several serial commands at once, but it must be assured that the responses not exceed 64 byte, the length of a special output buffer for the interpreter. This output can be obtained with the cgi command line "c C S %s".

2.4 Forms input

2.4.1 POST parameter

Only used for file uploading and SD card formating so far.

2.4.2 GET parameter

Syntax:

Sometimes the command strings don't need and examine parameter values given (nothing noted after the equal sign), but most commands need them formed exactly as described below in C-printf syntax:

%d   integer

%u   unsigned integer

%f   floating point number

%s   string

All other characters have to appear exactly as they are shown.

Parameter list:

MR=e   Move Eastward

MR=w   Move Westward

MR=q   Stop moving RA

MD=n   Move Northward

MD=s   Move Southward

MD=q   Stop moving DEC

PH=   Park at Home Position

Ph=   Set Home Position

PC=   Park at CWD Position

PS=   Sleep Telescope

PW=   Wakeup Telescope

hc=0..2   Set Hand Controler into Visual (0), Photo(1) or All Speed Mode

hB=0..7   Hand Controler brightness

hC=0..2   Hand Controler color scheme (day, dawn, night)

ts=0..6   Set Tracking Mode (Sidereal ,King, ...)

du="%u.%u.%u"   UTC Date

dc="%u.%u.%u"Civil Date

tu="%u:%u:%u" UTC Time

tc="%u:%u:%u" Civil Time

tr="%u:%u:%u" Target Right Ascension

td="%d:%u:%u" Target Declination

tR="%u"   Target Physical Right Ascension

tD="%u"   Target Physical Declination

ta="%d:%u:%u" Target Azimuth

te="%u:%u:%u" Target Elevation

mn="%u"   Current model number 0..1

sm="%u"   Store current model under number 0..1

cm="%u"   clear model number #

aa=   Additional Alignment

Sm=   Synchronize

ia=   Initial Alignment

mt="%u"   mount type

wr="%d"   Worm ratio in right ascension

wd="%d"   Worm ratio in declination

sr="%u"   Spur ratio in right ascension

sd="%u"   Spur ratio in declination

mr="%u"   Motor encoder resolution in right ascension

md="%u"   Motor encoder resolution in declination

dt="%u"	DEC TVC step count
R1="%c"	Move Speed: G=Guide, C=Center, M=Move, S=Slew
VM="%d"	Manual Slewing Speed RA
Vm="%d"	Manual Slewing Speed DEC
VT="%d"	GoTo Slewing Speed RA
Vt="%d"	GoTo Slewing Speed DEC
VV="%d"	Move Speed RA
Vv="%d"	Move Speed DEC
Vi="%d"	Increment Move Speeds by the given value. If omitted, default is 50.
Vd="%d"	Decrement Move Speeds by the given value. If omitted, default is 50.
VA="%f"	RA Slewing Acceleration
Va="%f"	DEC Slewing Acceleration
VC="%u"	RA Centering Speed
Vc="%u"	DEC Centering Speed
VG="%u.%u"	RA Guiding Speed
Vg="%u.%u"	DEC Guiding Speed
Sr="%u°%u"	Right Safety Limit
Sl="%u°%u"	Left Safety Limit
Sg="%u°%u"	Western GoTo Limit

ER="%d"   Axis Encoder RA resolution

ED="%d"   Axis Encoder DEC resolution

ep="%u"   encoder port usage, 0..15

si="%u"   select location

sn="%s"   site name

st="%d:%u:%u" Timezone (minutes and seconds can be omitted)

so="%d°%u'%u"Longitude

sa="%d°%u'%u"Latitude

se="%d"   Elevation

s#="%u"   site number

gp="%u"   Query GPS receiver at serial ports 0..3

bm="%u"   default boot mode, 0..3 for Cold Start, Warm Start, Warm Restart, Ask, if possible

bo="%u"   select boot mode, 0..2 for Cold Start, Warm Start, Warm Restart

s0="%u"   Baud rate selection, serial port 0

s1="%u"   Baud rate selection, serial port 1

s2="%u"   Baud rate selection, serial port 2

s3="%u"   Baud rate selection, serial port 3

sg="%u"   Baud rate selection for GPS receiver

ct="%u"   Catalog selection (active catalog file id)

ff="%u"   Firmware flashing (selected firmware file id)

CN="%s"   Catalog Name selection

DN="%s"   Directory to change to

co="%s"   Catalog object string

SO="%u"   Solar System object number (Sun=0, ...)

gtf=   enforce meridian flip

GT=   start GoTo

GP=   start Physical GoTo

GA=   start Alt/Az GoTo

prec="%u"   always precess ('1') given coordinates or not ('0')

swCM="%u"   swap serial commands :CM# and :Cm# functionality: Synchronize<->Additional
Align

sdo=   precess given object coordinates

ip="%u.%u.%u.%u"   current IP Address

msk="%u.%u.%u.%u"   current IP Netmask

gw="%u.%u.%u.%u"   current IP default gateway

pdns""%u.%u.%u.%u"   current Primary DNS server

sdns""%u.%u.%u.%u"   current Secondary DNS server

Ip="%u.%u.%u.%u"   static IP Address

Msk="%u.%u.%u.%u"   static IP Netmask

Gw="%u.%u.%u.%u"   static IP default gateway

Pdns""%u.%u.%u.%u"   static Primary DNS server

Sdns""%u.%u.%u.%u"   static Secondary DNS server

3. Character encoding

Gemini-II supports internationalized messages. Special characters have to be displayed by the HC, browsers as well as they have to be exchanged between browser.

XML-like character encoding is the only form of encoding that is fully supported by most browsers not only for displaying HTML pages, but also for Ajax technologies, which requires valid XML. For this reason, special characters should be coded int UCS Universal Character Set as defined by ISO/IEC 10646. Characters are encoded as nnumeric entities using the format

&#nnnn;

where nnnn is the numeric representation of the character (leading zeros my be omitted).

The graphical HC supports XML encoded Greek lowercase characters with nnnn reaching from 945 to 969:

945:    alpha   (coded: α)

946:    beta   β

947:    gamma γ

948:    delta   δ

949:    epsilon ε

... until ...

969:    omega ω

The HC also supports the most common German, French and Spanish special characters. So far that are:

196: Ä

205: Í

214: Ö

218: Ú

220: Ü

224: à

225: á

228: ä

231: c cedilla

232: è

233: é

234: ê

237: í

241: ~n (n with tilde above)

243: ó

246: ö

250: ú

252: ü