OpenCable™ Guidelines

Enhanced TV User Interface Guidelines

OC-GL-ETV-UIG-V02-060418

RELEASED

Notice

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1 SCOPE

1.1 Introduction and Overview

This document describes voluntary User Interface (UI) guidelines and defines UI conventions for programmers and MSOs.

The genesis of this effort was to define a cable industry convention to announce and launch television enhancements. As England has adopted the 'red button' as a means to launch enhancements, this document describes a means of launching applications that is independent of specific remote control configurations.

Aside from defining a convention for alerting viewers to the presence of an enhancement, and defining how enhancements are launched and dismissed, this document also describes a minimal set of conventions that are designed to aid viewers in interacting with enhancements while allowing designers maximum freedom in creating enhancement applications.

Display and behavior characteristics for several enhancement components are also described for several categories of devices, from devices with limited capabilities, to fully capable devices. This document is a starting point for developers, and is not a comprehensive style guide or set of widgets.

1.2 Purpose of document

The purpose of this document is to specify a minimum set of User Interface conventions and application characteristics to aid viewers in selecting, managing, and interacting with enhanced television programming. The goal of these definitions is to provide a baseline set of expectations for viewers.

Several enhancement components are defined; prompt, loading message, and application. Display and behavioral aspects are described in order to provide guidance to developers. These aspects have more to do with setting developer expectations regarding platform support than with setting constraints.

2 REFERENCES

2.1 Normative References

[OCAP] OpenCable Application Platform Specification, OCAP 1.0 Profile, OC-SP-OCAP1.0-I16-050803, August 3, 2005, Cable Television Laboratories, Inc.

2.2 Informative References

[ITV] ITV Safe Area for Text and Graphics Over Video, by Walt Klappert and David Preisman, March 29, 2005 Version 1.0

2.3 Reference Acquisition

CableLabs Specifications:

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027;
  Phone 303-661-9100; Fax 303-661-9199; Internet: http://www.cablelabs.com /

3 TERMS AND DEFINITIONS

This specification uses the following terms:

Animation	The successive modification of an attribute of a visual element.
Application	A software application. In this context, one that presents a User Interface and accepts input from a viewer
Button	A visual element that signals an action that a viewer may make, and changes visual representation when such an action is taken.
Carousel	A means by which data and applications are successively broadcast along with TV programming
Cookie	A file saved on the device on which an application executes, which enables successive instantiations of an application to recover information saved during previous instantiations.
Dismiss	To actively cause an application to stop executing.
Enhanced TV (ETV)	A general term that refers to interactive services and applications that are provided in conjunction with video programming.
Enhancement	A software application that executes in conjunction with video programming.
Exit	The termination of an application, caused by viewer behavior.
Graphics Overlay	A visual element presented on top of video programming.
ITV Safe area	The newly defined area on a television display that may contain visual elements without danger of their being distorted or not seen on almost all televisions sets. This is about 84% of the horizontal and 84% of the vertical distances covered by the video. All text and actionable on-screen buttons should not extend beyond this region. The table in Appendix I gives the pixel locations for this are for the SA2000 and the DCT2000 set-top boxes.
Loading Message	An application element that indicates to a viewer that data is being acquired off the network.
Programmer	A television programmer who is the originator of an enhancement.
Prompt	An application element that signals to a viewer that an application is present and may be launched.
Prompt Interval	The period of time between two instantiations of a prompt.
Remote Key	An event generated when a remote control button is pressed.
Scaled Video	A window of video that is less than full screen.

Select	To indicate that a particular action is to take place. For instances, a viewer may press the remote control key labeled 'select', 'OK', or 'enter' in order to cause the action represented by the currently highlighted on screen button to occur.
Signaling	Messages sent in a broadcast program, or over the network by other means that contain information to launch or control an application.
Template	A predefined widget or set of widgets.
Temporal Context	The time during which an application runs relative to its original broadcast. For instance, an enhanced program may be played back from a DVR sometime after its original broadcast.
Time Out	An action taken by an application, such as termination, after a period of time in which no viewer input has been detected.
Title Safe area	The traditional area on a television display that may contain visual elements without danger of their being distorted or not seen. This is about 80% of the horizontal and 80% of the vertical distances covered by the video. This region is considered to be conservative and, therefore, ITV Safe can be used to provide additional screen real estate. The table in Appendix I gives the pixel locations for this are for the SA2000 and the DCT2000 set-top boxes.
Transition	An animation occurring while an application updates it user interface.
User Interface	A presentation generated by an application that includes visual elements and responds to viewer actions.
Visual Element	A graphical object generated by an application. Examples include a text string, a shaded rectangle, and a bitmap.
Widget	A set of visual elements and their behaviors in response to viewer actions. Examples include a button than may have several visual states, each indicating a different relation to viewer action such as 'un-highlighted' highlighted, and selected.

4 ABBREVIATIONS AND ACRONYMS

This guideline document uses the following abbreviations:

DCT 2000 A model of cable TV receiver, manufactured by Motorola that may execute ETV applications.

ETV Enhanced TV, see above.

EPG Electronic Programming Guide

DVR Digital Video Recorder

GUI Graphical User Interface

MSO Multiple Service Operator, same as cable network operator

OCAP OpenCable Applications Platform

PiP Picture in Picture

UI User Interface, see above.

VOD Video on Demand

5 GENERIC ETV FLOW DIAGRAM

This section describes the process of loading and launching applications.

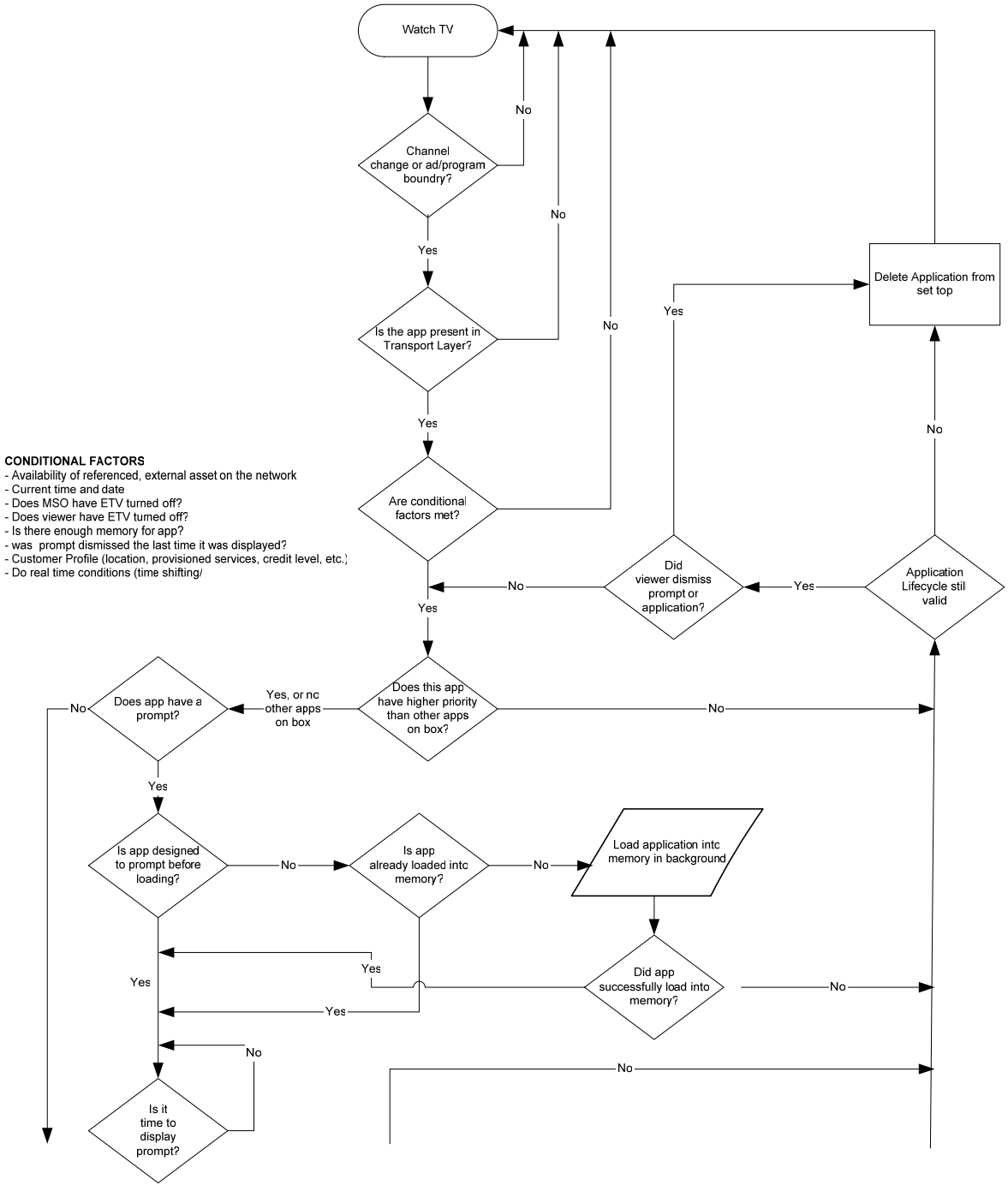

Figure 5-1 – Generic ETV Flow
(figure continued on next page)

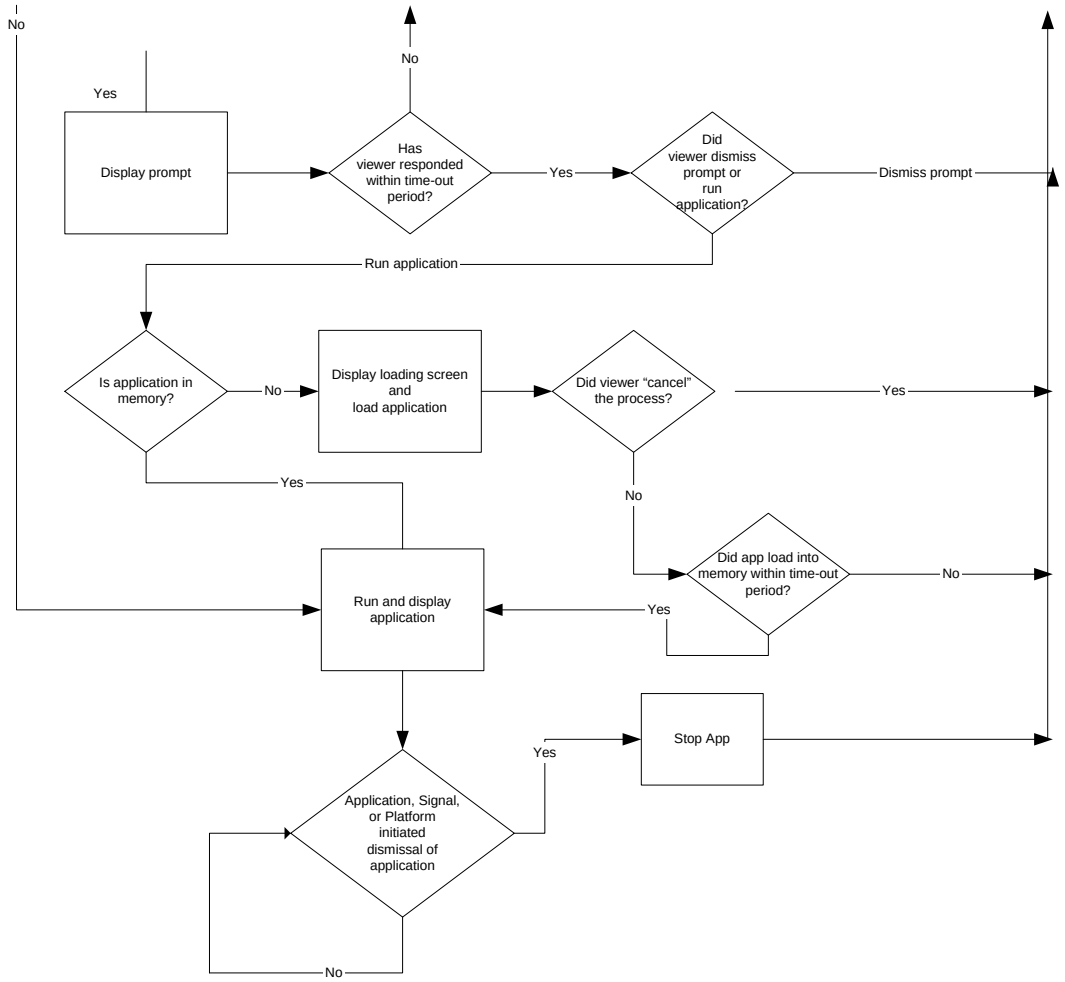

***Figure 5-1 – Generic ETV Flow** (cont. from previous page)*

6 SAMPLE SCREENS ETV FLOW

This section describes scenarios for alerting viewers to the presence of applications.

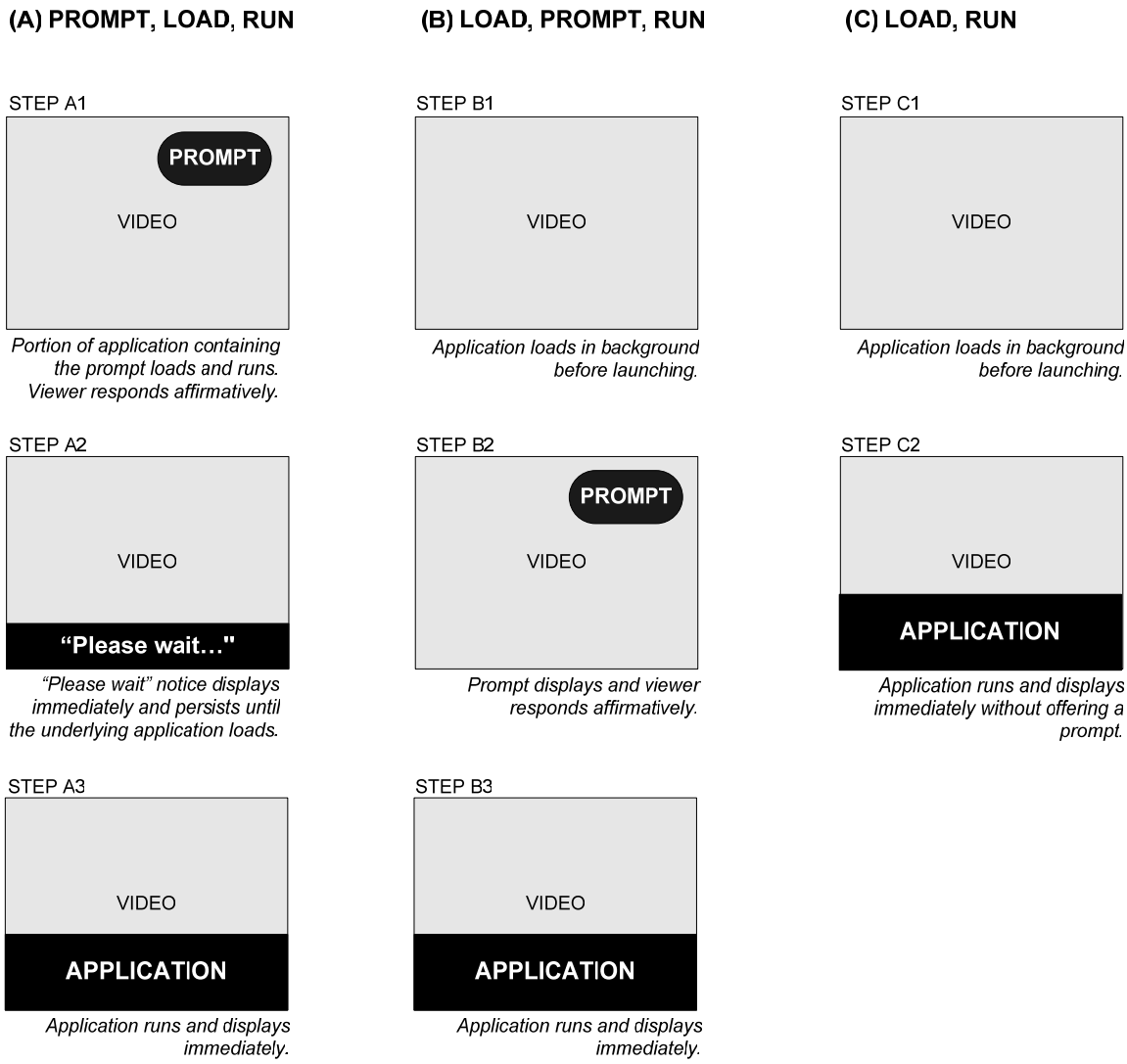

Figure 6-1 – Generic ETV Flow

There are several approaches that can be taken to handle the initial display of the ETV Prompt and the loading of other data for the application:

(A) Load only enough data to present the ETV Prompt and to be prepared to present a loading message if the prompt is selected. Then, when the Prompt is selected load the rest of the data. This scheme is essential if any of the data for the current application is not on the current channel and requires an automatic-tune-away-load-then-automatically-tune-back. This is also a good scheme when the programmer wants the Prompt to come up as quickly as possible.

Alternatively, load enough data to present the ETV Prompt as soon as possible but continue loading data in the background. Be prepared to present a loading message if the prompt is selected before loading has completed.

This scheme is recommended when the programmer wants the Prompt to come up as quickly as possible and the application is on the current channel.

(B) Load everything and then present the Prompt. If no enhancements occur during the first few minutes of the show, you can invisibly load all of the data then present the Prompt. This scheme is recommended when the programmer wants to eliminate the perceived delay from the time the viewer selects the Prompt and when he or she can start interacting with the enhancements. This assumes that all the data for all of the enhancements are on the current channel.

(C) Load the application and never show a Prompt. This scheme must be used carefully and infrequently. The viewer enters the ETV application without opting in. It should be used only when the content programmer has no other choice. For example, a thirty second commercial may not have enough time to allow a Prompt to be presented and selected. Instead, putting the viewer directly in the application after the load may be the only choice. Please use this scheme with care.

7 PROMPTS AND APPLICATIONS

This section illustrates application behavior in various scenarios.

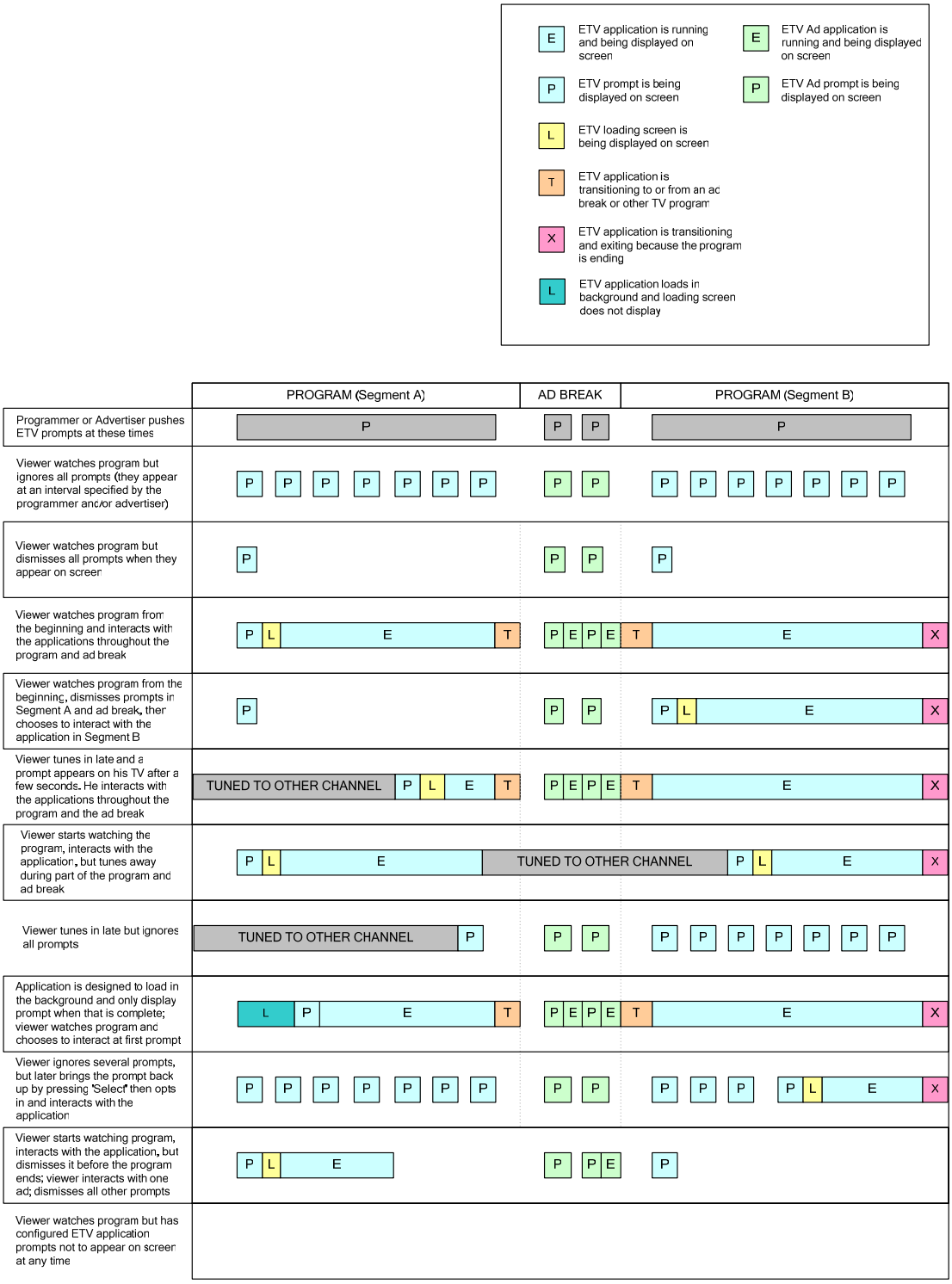

Figure 7-1 – Prompts and Applications

8 USER INTERFACE GUIDELINES

The following tables detail behavioral aspects or attributes of ETV application components. Columns represent the following:

Attribute: a behavioral aspect or attribute of an ETV component

Comment: explanatory details about an attribute

M - Minimally capable device: an 'X' in this column indicates that a minimally capable device is capable of supporting this attribute; a '-' in this column indicates that this attribute is not supported, and notes in this column indicate specific support details. A minimally capable device is a cable receiver that has the minimum resources to support ETV, and corresponds to a DCT-2000 class device.

P - Partially capable device: an 'X' in this column indicates that a partially capable device is capable of supporting this attribute; a '-' in this column indicates that this attribute is not supported, and notes in this column indicate specific support details. A partially capable device is a cable receiver that has resources to support many but not all attributes of TV, and corresponds to an Explorer-2000 class device

F - Fully capable device: an 'X' in this column indicates that a fully capable device is capable of supporting this attribute, and notes in this column indicate specific support details. A fully capable device is a cable receiver that has the resources to support all attributes of ETV, and corresponds to an [OCAP] capable device

C - Customer Configurable: an 'X' in this column indicates that a TV viewer can easily configure this attribute, a '-' indicates that a viewer cannot configure this attribute.

P - Programmer Configurable: an 'X' in this column indicates that the programmer of the ETV application can configure this attribute, a '-' indicates that the programmer cannot configure this attribute.

O - MSO Override: an 'X' in this column indicates that the MSO transmitting the ETV application can easily configure this attribute, a '-' indicates that the MSO cannot configure this attribute.

8.1 ETV Prompt

The "ETV Prompt" is the first thing that a viewer sees in the Enhanced TV application experience. It appears on screen and indicates to viewers that an application is available in conjunction with the currently tuned video program. A prompt is an optional feature. In some cases, such as a 30 second spot, a simple UI may be launched without a prompt. A prompt provides a call to action, and provides a means for programmer to add a branding message.

8.1.1 Graphic Appearance and Audio

This table lists graphics and audio related attributes of an ETV prompt, and indicates the level of support on each device class.

Table 8-1 – Prompt Graphics and Audio Attributes

#	Attribute	Comment	M	P	F
8.1.1.1	Logo	Corporate Identifier that typically includes text.	X	X	X
8.1.1.2	Icon	Standard symbolic graphic indicating 'call to action' for ETV.	X	X	X

#	Attribute	Comment	M	P	F
8.1.1.3	Cel Animation	Successive display of bitmaps. Device support is constrained by memory and processor speed	X	X	X
8.1.1.4	Static graphics	All devices support display of static bitmaps.	X	X	X
8.1.1.5	Translucency animation	Successive modification of translucency of a prompt element, such as the logo, icon, or other element.	X	X	X
8.1.1.6	Position	Restrict to upper left corner of display.	X	X	X
8.1.1.7	Size	Size is restricted to a maximum of 273 pixels long by 43 pixels high with a font size between 18 and 32 point. Mock ups are included in Appendix III.	X	X	X
8.1.1.8	Color depth		8 bit	16 bit	24 bit
8.1.1.9	Transparency	Overall transparency of graphics plane.	X	X	X
8.1.1.10	Font-based text	Each platform provides a different level of support for fonts. DCT 2000 supports downloadable outline fonts.	X	X	X
8.1.1.11	Audio	In-memory audio sample (mix, volume control).	-		X

8.1.2 Display Timing

This table lists display timing attributes of an ETV prompt, and indicates the entities that can influence the attribute.

Table 8-2 – Prompt Display Timing Attributes

#	Attribute	Comment	C	P	O
8.1.2.1	Appearance immediately on download	Application signaling typically indicates that prompt displays as soon as prompt resources have been download.	-	X	-
8.1.2.2	Appearance after download	ETV application may delay display of prompt. Application may wait for synchronization trigger, or use other logic to determine when to display prompt.	-	X	-
8.1.2.3	Time-out	Prompt should not remain on screen indefinitely. Time-out occurs if viewer does not actively 'select' or 'dismiss' it. Time-out period is determined by programmer. Minimum display time: 5 seconds. Maximum display time: 60 seconds.	-	X	X
8.1.2.4	Interval between display of prompt	Prompt may reappear after time-out or after it's been dismissed.	-	X	X

8.1.3 Display Conditions

This table lists the display conditions of an ETV prompt, and indicates the entities that can influence the attribute.

Table 8-3 – Prompt Display Conditions

#	Attribute	Comment	C	P	O
8.1.3.1	Display of prompt may be discontinued on a channel	Enhancements may be inhibited on a per channel basis.	X	X	X
8.1.3.2	Display of prompt may be discontinued on all channels	Enhancements may be inhibited overall.	X	-	X
8.1.3.3	Prompt may be configured to display as soon as Prompt is in memory, or when other application components are loaded.	The prompt may display immediately, which may require a loading phase after selection. Alternatively, the programmer may configure the prompt to display only when other applications modules or the entire application is loaded into memory.	-	X	-
8.1.3.4	Prompt may be configured to display only if all external assets referenced by application are available on the network	Examples include DVR assets, VOD assets, applications or data, TV channels in the lineup, the occurrence of a show that is airing, the occurrence of a show in the EPG.	-	X	X
8.1.3.5	Prompt may be programmed to display conditional information or content.	Prompt may be configured according to runtime conditionals. Examples of conditionals are data stored in local files or retrieved from the network, or device properties.	-	X	X
8.1.3.6	Prompt may be programmed to display only if the application is being accessed during a designated window of opportunity (this is for viewers who watch the show time-shifted using DVR, VOD)	An example of this is an episode of "American Idol" where the voting is only allowed for a few hours after the show airs. Applications will be able to determine their 'temporal context' and configure themselves accordingly.	-	X	X

8.1.4 Functional Logic

This table lists the functional logic attributes of an ETV prompt, and indicates the entities that can influence the attribute.

Table 8-4 – Prompt Functional Logic Attributes

#	Attribute	Comment	C	P	O
8.1.4.1	On select, the prompt is replaced by the loading message or application.	Immediate visual feedback is required after viewer make selection.	-	-	-
8.1.4.3	If Prompt times-out or is dismissed, viewer may indicate select to cause prompt to redisplay	ETV application executes when prompt is not displayed, and may respond to select event.	-	X	X
8.1.4.4	Prompt does not have to be displayed in some contexts	1. If application state is saved, and service is tuned away and tuned back within brief period. 2. After ad break. 3. For 30 sec ad.	-	X	X

#	Attribute	Comment	C	P	O
8.1.4.5	On dismiss, prompt is immediately removed		-	-	-

8.2 ETV Loading Message

The "ETV Loading Message" is displayed when an application that is being requested is not yet in memory. The only possible viewer input is to dismiss.

8.2.1 Graphic Appearance and Audio

This table lists graphics and audio related attributes of an ETV loading message, and indicates the level of support on each device class.

Table 8-5 – Loading Message Graphics and Audio Attributes

#	Attribute	Comment	M	P	F
8.2.1.1	Cel Animation	Successive display of bitmaps. Device support is constrained by memory and processor speed.	X	X	X
8.2.1.2	Static graphics	All devices support display of static bitmaps.	X	X	X
8.2.1.3	Translucency animation	Successive modification of translucency of a prompt element, such as the logo, icon, or other element.	X	X	X
8.2.1.4	Position	Ability to set arbitrary position.	X	X	X
8.2.1.5	Size	All devices support arbitrary size of the loading message, up to 'ITV safe' area.	X	X	X
8.2.1.6	Color depth		8 bit	16 bit	24 bit
8.2.1.7	Transparency	Overall transparency of graphics plane.	X	X	X
8.2.1.8	Font-based text	Each platform provides a different level of support for fonts. DCT 2000 supports downloadable outline fonts.	X	X	X
8.2.1.9	Audio	In-memory audio sample (mix, volume control).	-	-	X

8.2.2 Display Timing

This table lists display timing attributes of an ETV loading message, and indicates the level of support on each device class.

Table 8-6 – Loading Message Display Timing Attributes

#	Attribute	Comment	C	P	O
8.2.2.1	Loading message shall be displayed immediately after viewer chooses to engage the ETV application	Viewers shall always receive immediate visual feedback in response to an action.	-	X	-

8.2.3 Functional Logic

This table lists the functional logic attributes of a loading message, and indicates the entities that can influence the attribute.

Table 8-7 – Loading Message Functional Logic Attributes

#	Attribute	Comment	C	P	O
8.2.3.1	Loading message is displayed on-screen up to a maximum amount of time, after which the process times out	Less than 10 seconds loading is best, greater than 30 seconds requires a warning. Enhancement should be signaled late enough after the start of a program to accommodate loading.	-	X	X
8.2.3.2	If loading fails for any reason (network interruption, out of memory,…) a message to the user shall be displayed		-	X	-
8.2.3.3	Cancel button stops the loading process		-	X	-

8.3 ETV Application

The ETV application is the main body of the interactive portion of an enhanced program. Applications may take many forms, from very simple informational displays to extremely complex interactive games. These guidelines are meant simply to provide viewers a minimal set of trustworthy conventions, without fettering the creativity of application developers.

8.3.1 Graphic Appearance and Audio

This table lists graphics and audio related attributes of an ETV Application, and indicates the level of support on each device class.

Table 8-8 – Application Graphics and Audio Attributes

#	Attribute	Comment	M	P	F
8.3.1.1	Cel Animation	Successive display of bitmaps. Device support is constrained by memory and processor speed.	X	X	X
8.3.1.2	Static graphics	All devices support display of static bitmaps.	X	X	X

#	Attribute	Comment	M	P	F
8.3.1.3	Translucency animation	Successive modification of translucency of a prompt element, such as the logo, icon, or other element.	X	X	X
8.3.1.4	Position	Ability to set arbitrary position.	X	X	X
8.3.1.5	Size	All devices support arbitrary size of the application. The background may extend over the entire graphics space and bleed off the screen. Any actionable areas or text, however, must be restricted to the 'ITV safe' area.	X	X	X
8.3.1.6	Color depth		8 bit	16 bit	24 bit
8.3.1.7	Transparency	Overall transparency of graphics plane.	X	X	X
8.3.1.8	Font-based text	*Each platform provides a different level of support for fonts.* DCT 2000 supports downloadable outline fonts.	X	X	X
8.3.1.9	Audio	In-memory audio sample (mix, volume control)	-	X	X
8.3.1.10	Buttons	Buttons are onscreen representations of actions; each button inhabits one of at least 3 modes: unselected, selected, on-click. Only one button may be in the selected mode at a time.	X	X	X
8.3.1.11	Graphics overlay	Graphics over full-screen.	X	X	X
8.3.1.12	Video Scaling	Video scaling presents video in a logical graphics plane. Video scaling is not identical to Picture in Picture (PiP). PiP requires at least two in-band tuners and requires special hardware support. PiP sizing is limited to hardware capability, and applications are not presented in PiP windows. Application graphics displayed in a scaled video window should be aware that the clipping region of the window is more constrained than for full screen.	-	X	X
8.3.1.14	Invisible buttons, links	An invisible button/link can be described as containing no fill color so that program video shows through. Viewer experience is that they are "clicking on" a broadcast graphic. Application event timing is critical for quality of this feature.	X	X	X

8.3.2 Display Conditions

This table lists the display conditions of an ETV application, and indicates the entities that can influence the attribute.

Table 8-9 – Application Display Conditions

#	Attribute	Comment	C	P	O
8.3.2.1	UI may be programmed to display conditional information or content.	UI may be configured according to runtime conditionals. Examples of conditionals are data stored in local files or retrieved from the network, or device properties.	-	X	X

8.3.3 Functional Logic

This table lists the functional logic attributes of an ETV application, and indicates the entities that can influence the attribute.

Table 8-10 – Application Functional Logic Attributes

#	Attribute	Comment	C	P	O
8.3.3.1	Navigation scheme	If action is to tied a remote button, there should also be an on-screen representation, such as a button.	-	X	-
8.3.3.2	Application timeout, redisplay	To avoid monitor burn in, application UI should be refreshed after 5 minutes. If application is to persist display for more than 2 hours, it should inform about burn in and allow user to opt-in.	-	X	X
8.3.3.3	Applications should be temporally sensitive, i.e., aware of time-shifted and post broadcast temporal contexts	Applications should be configured such that they behave properly when associated with VOD, DVR, and time-shifted services	-	X	-
8.3.3.4	Applications should execute conditionally on external dependencies in all temporal contexts.	Examples include DVR assets, VOD assets, applications or data on the network, TV channel in the lineup, the occurrence of a show that is airing, the occurrence of a show in the EPG. Conditions may inhibit app from launching or cause it to run differently.	-	X	X
8.3.3.5	Channel change effected by application	UI to indicate channel change will occur.	-	X	-
8.3.3.6	Channel change effected by system	Application may be alerted that channel change will occur. Application cannot inhibit channel change.	-	X	-
8.3.3.7	Application effected termination	Application may be terminated at any time by remote key 'exit'. Applications are expected have an 'exit' button easily accessible.	-	X	-
8.3.3.8	Transactions	UI should present dialog to inform viewer of impending charge and allow opt out.	-	X	-
8.3.3.9	Widgets	A standard set of widget templates may be developed to aid application developers.	-	X	-
8.3.3.10	Return channel behavior	Massive real time messaging will incur network latencies.	-	X	X

8.4 Promotion of ETV Program in EPG

8.4.1 Graphic Appearance

This table lists graphics and audio related attributes of an ETV promotion in an EPG, and indicates the level of support on each device class.

Table 8-11 – Promotion of Application in EPG Graphics and Audio Attributes

#	Attribute	Comment	M	P	F
8.4.1.1	EPG Listing	The fact that the program has an enhancement available may be earmarked in the EPG in a standardized manner.	X	X	X

8.5 Input Events

A set of remote control keycodes are available to any application that currently has focus. Focus means that an application is drawn on top of any other applications, and is guaranteed to receive the following etv MOK key events. Note that labeling of buttons on remotes is not standardized, so while the set of keycodes is well known, the corresponding labeling may not be identical, e.g., a button labeled 'enter' might cause the 'select' keycode to fire.

The etv application is guaranteed access to the following etv MOK keys across CableLabs, GuideWorks, and TWC ATG TV platforms:

0-9
Select
Up Arrow'
'Down Arrow'
'Left Arrow'
'Right Arrow'
Page Up / Plus
Page Down / Down

Some keycodes are expected to cause a specific behavior.

'select' is expected to cause the currently highlighted widget to transition to the 'selected' state and cause a state transition in the application. Receipt of a select event while a prompt is displayed shall cause the application to transition from the prompt state to another application state.

'info' is expected to cause the application to present information about itself. This is the responsibility of the application.

'exit' is expected to cause the application to immediately transition to a state that causes it to loose focus and remove its presentation from the display. This is true during the prompt phase of the application.

Appendix I ITV Safe Area Table

Comprehensive Findings for Screen Regions:

		Title Safe			Action Safe			ITV Safe		
	Pixel aspect ratio	**WxH***	**Upper Left corner (x,y)**	**Lower Right corner (x,y)**	**WxH***	**Upper Left corner (x,y)**	**Lower Right corner (x,y)**	**WxH***	**Upper Left corner (x,y)**	**Lower Right corner (x,y)**
SA2000 Hi-Res 640x480 pixel mode	square	512x384	64,48	575, 431	576x432	32,24	607, 455	538x404	51, 38	588, 441
SA2000 Low-Res 320x240 pixel mode	square	256x192	32,24	287, 215	288x216	16,12	303, 227	268x202	26, 19	293, 220
Designing on 640x480 canvas	square	512x384	64,48	575, 431	576x432	32,24	607, 455	538x404	51, 38	588, 441
Motorola DCT2000 Hi-Res 704x480 pixel mode	rectangular	564x384	70,48	633, 431	634x432	35,24	668, 455	592x404	56, 38	647, 441
Motorola DCT2000 Low-Res 352x240 pixel mode	rectangular	282x192	35,24	316, 215	316x216	18,12	333, 227	296x202	28, 19	323, 220
Designing on 704x480 canvas	rectangular	564x384	70,48	633, 431	634x432	35,24	668, 455	592x404	56, 38	647, 441

* Figure has been rounded to nearest even numbered pixel when needed so that it can be centered

Screenshot: A screenshot showing examples of the current common practice of extending text crawl and other text elements beyond the traditional Title Safe Area. The figure also shows the traditional Title Safe (yellow), Action Safe (red) and the new ITV Safe (green) Areas.

Appendix II Acknowledgements (Informative)

CableLabs wishes to heartily thank those individuals and their organizations that contributed to drafting this document.

James Glasscock – Turner

Jeff Jay – Charter Communications

Special thanks for these individuals who devoted a significant amount of time to this effort.

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David Preisman – Showtime

MSO Review and Comments:

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Frank Sandoval – CableLabs

Hugh Josephs – TWC Advanced Technology Group

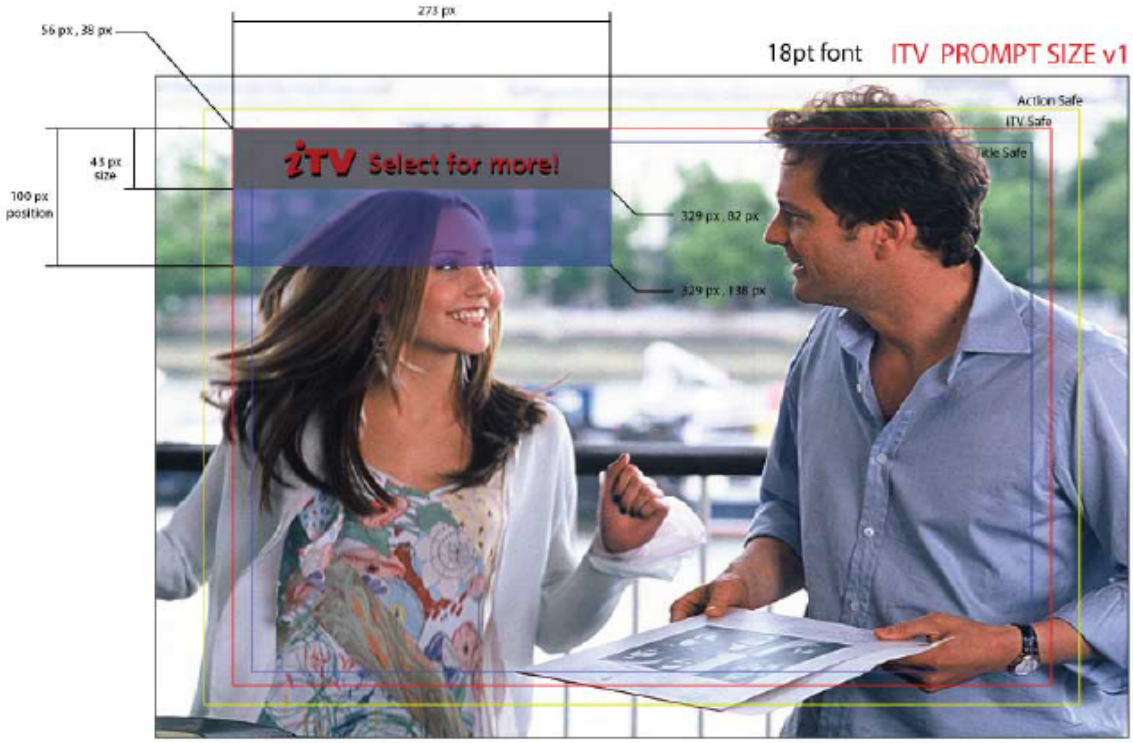
Michael Feldman – GuideWorks

Reed Spiegel – GuideWorks

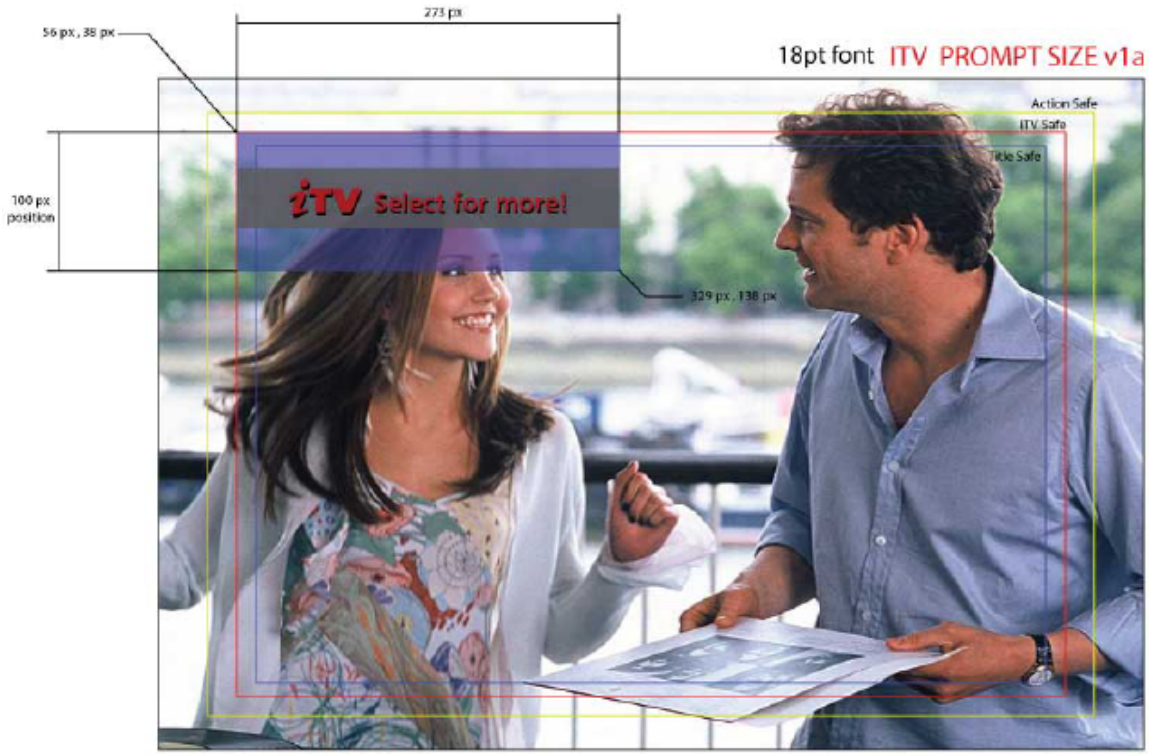
Tony Daddario – GuideWorks

Jon Radloff - GuideWorks

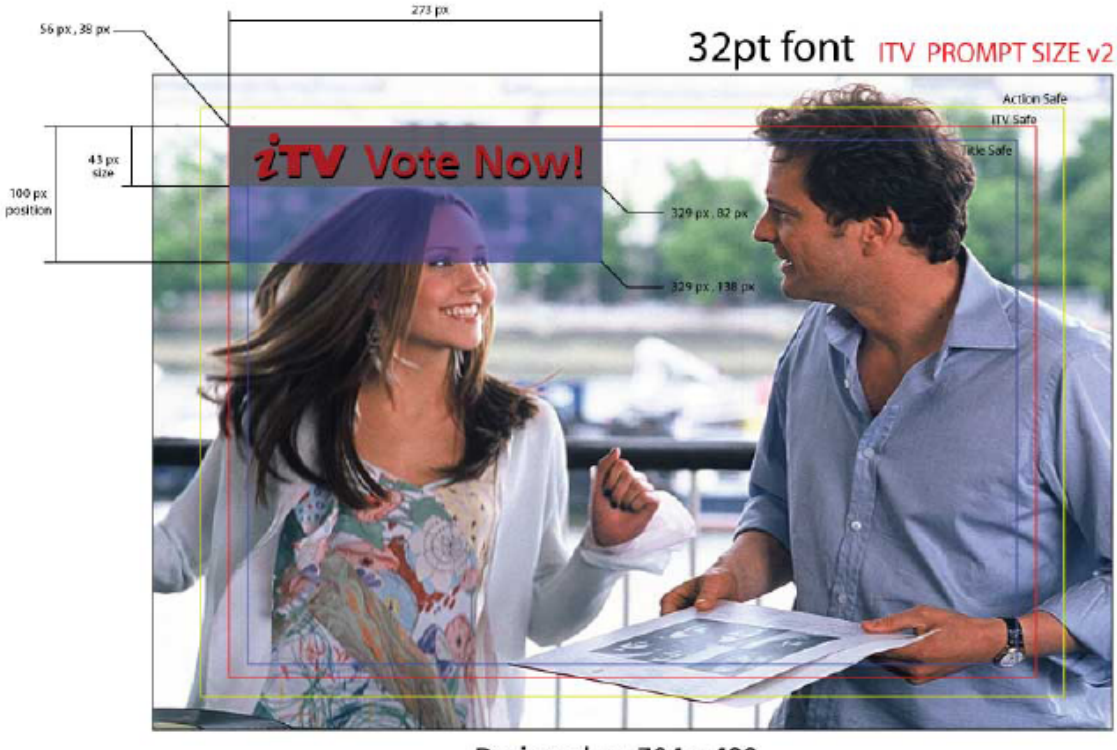
Appendix III Prompts (Informative)



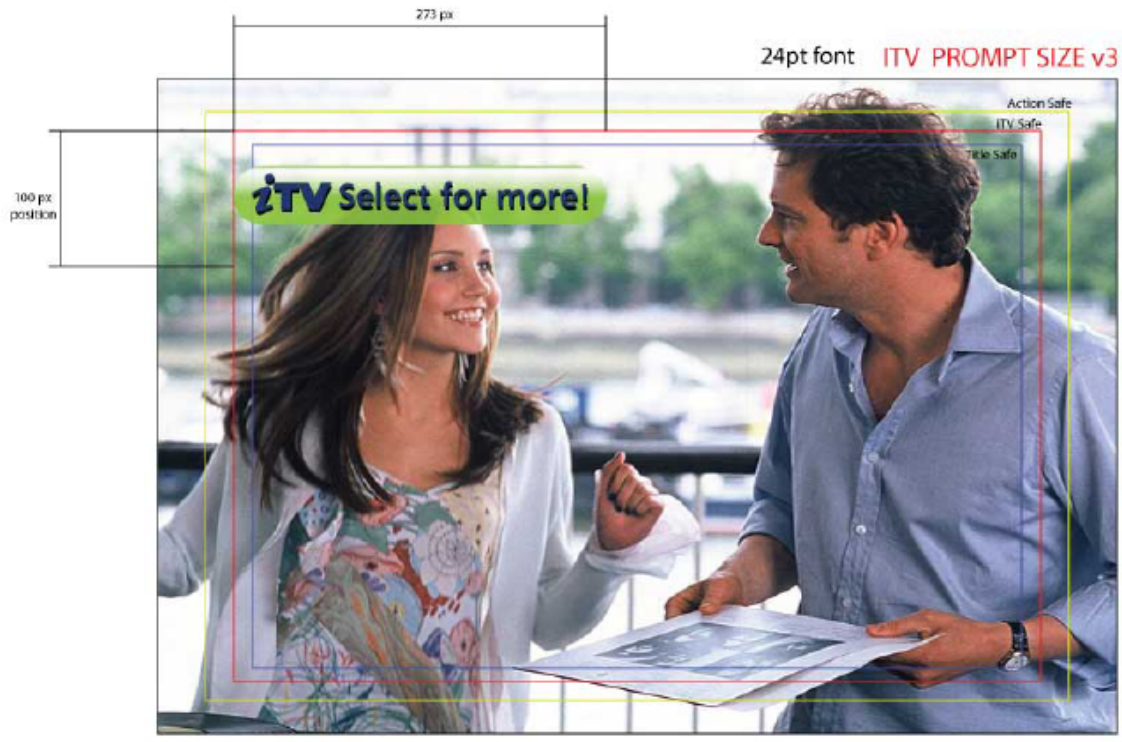
Designed on 704 x 480



Designed on 704 x 480



Designed on 704 x 480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24pt font
ITV PROMPT SIZE v3
Action Safe
iTV Safe
Title Safe
100 px position
iTV Select for more!
Designed on 704 x 480