

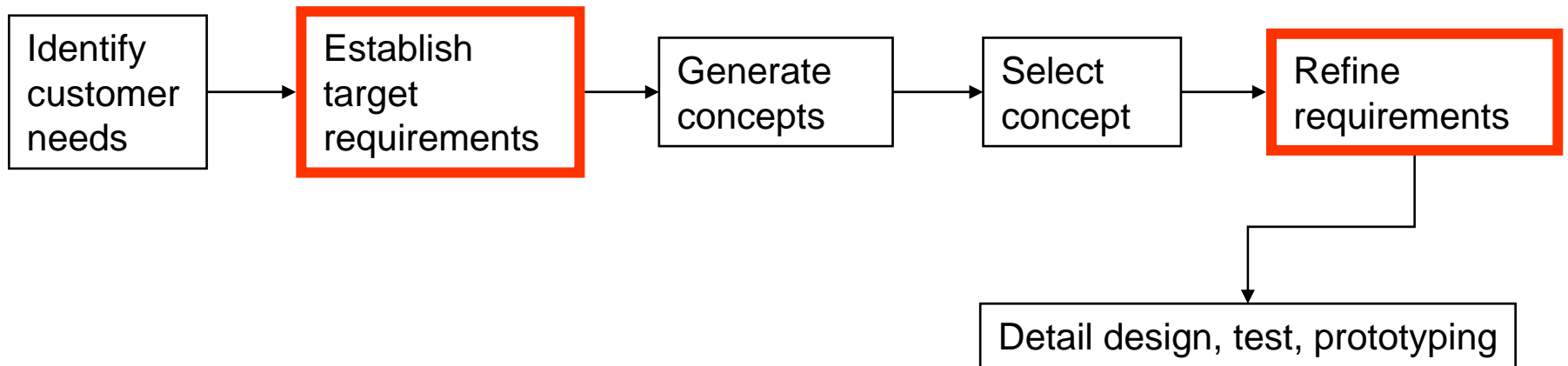
SETTING PRODUCT REQUIREMENTS

As practiced in ME4054

(Ref: Chap. 5, Ulrich & Eppinger text)

SETTING PRODUCT REQUIREMENTS

When?



Would you buy this stereo?



Denon AVR-5803 _ _ _ THX Ultra2 Certified THX Surround EX/DTS ES 6.1 Discrete/Dolby Digital EX Pro Logic II/DTS A/V Surround Reference Receiver (www.denon.com)

PRODUCT SPECIFICATIONS

THX Ultra2 Certified • THX Surround EX; DTS Extended Surround Discrete 6.1; DTS ES Matrix 6.1; DTS Neo:6 Cinema & Neo:6 Music Matrix Decoding; Dolby Digital; Dolby Pro Logic; Dolby Headphone; DTS • Ultra2 7.1 Cinema and Music modes • Lucasfilm Home THX Cinema 4.0, 5.1 and 6.1ES post-processing; THX Surround EX decoding • DVD-Audio decoding with Adjustable Digital Bass Management, Delay, Channel Levels and Tone Controls, through DENON Link or External Analog Inputs • DDSC-Digital featuring New dual Analog Devices HammerHead SHARC 32-bit floating point DSP processors • 7 Channels equal power amplifier section • 170 watts per channel (8 ohms, 20 Hz-20 kHz, <.05%THD) • 200 watts per channel (6 ohms, 20 Hz-20 kHz, <.05%THD) • 24 bit, 192 kHz A/D conversion (Burr-Brown PCM-1804 x 4) on all analog inputs, including External 7.1 inputs • 16 Burr-Brown PCM-1738E 24-bit, 192-kHz highest resolution DACs, with DSD compatibility - each audio channel operating in differential mode • Pure Audio mode, features 4 DACs per audio channel in dual-differential mode • ALPHA 24 Processing Plus in Stereo/Direct/Pure Direct modes (left/right channels) • 4 24 bit, 192 kHz Digital Interface Receivers • 3 sets component video inputs, compatible with wideband (480p, 720p, 1080i) response for progressive DVD, DTV (100 MHz) • 8 sets composite and "S" video inputs • Video Conversion of Composite to S-Video and/or to Component • 1 AC-3 RF digital input for laser disc • TWO sets of 7.1 external wide bandwidth (100 kHz) inputs for multi-channel formats with full Bass Management(defeatable) • 11(5 Coax, 6 Opt.) assignable digital inputs • 8 Channel Digital External Inputs • 13 analog inputs including built-in AM/FM tuner • Multi-Zone 1 stereo pre-amp outputs with video output • Multi-Zone 2 outputs, pre-amp outputs or speaker outputs • RS-232C port for external controllers • Remote In/Out Ports • 12 and 5 volt triggers • DENON Link, for connection to DVD-9000 • Variable high/low pass Crossover 40/60/80/100/120 • Audio Delay adjustment to match audio signals with video signals(0-200ms) • Digitally regulated volume control with .5dB increment adjustments and step range of -80 to +15 • Delay time adjustment increased to 20 feet per speaker in .1 foot increments • Auto Surround Mode stores modes by signal type(analog or digital) in memory • AKTIS RC-8000 LCD touchpanel remote with IR and RF transmission capability included • AKTIS RC-8001ST Charger/RF Base Station included • Download the owner's manual in PDF format • Dimensions: 17.1"w x 8.5"h x 19.1"d • SRP \$4300

How do you decide?

- 170 watts per channel (8 ohms, 20 Hz-20 kHz, <.05%THD)
- 200 watts per channel (6 ohms, 20 Hz-20 kHz, <.05%THD)
- 24 bit, 192 kHz A/D conversion (Burr-Brown PCM-1804 x 4) on all analog inputs

Match customer needs to specifications

DEFINING PRODUCT REQUIREMENTS

- ◆ A documented statement of what the product is to do
- ◆ Living document
- ◆ Driven by customer needs
- ◆ Shows what you are trying to achieve
- ◆ Contains:
 - List of Customer Needs
 - Design Specifications

Exercise: Create a Product Specification Table

Create an excel spreadsheet with the appropriate headings

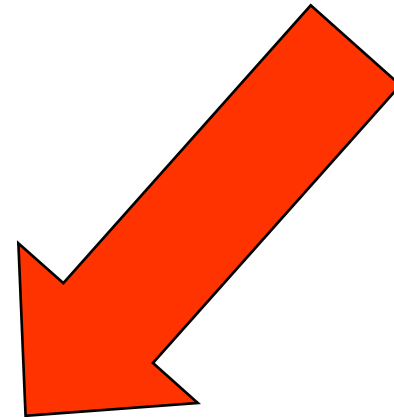
Product Specifications

Rev xxx

Metric #	Need #'s	Metric	Importance	Units	Marginal Value	Ideal Value

METRICS (I)

- ◆ **The design criteria**
- ◆ **Should be:**
 - **Practical**
 - **Achievable**
 - **Easy to understand**
 - **Derived from a customer need**



METRICS (II)

“Hard”

<u>Need</u>	<u>Metric</u>
Must fit in a toolbox	Size
Wants to pick up	Weight
Concerned with cost	Cost

“Soft”

<u>Need</u>	<u>Metric</u>
For DIY market	Easy to assemble

Target values

- ◆ **Numeric....with units**
 - 4.0 lbs, or 2 by 2 ft, or 20\$
- ◆ **Express target as:**
 - Exact (\$20)
 - Less than (< \$20)
 - Greater than (>\$20)
 - Range (\$20-\$30)

Example: Product Specifications for Cordless Screw Driver

Metric #	Need #'s	Metric	Importance	Units	Marginal Value	Ideal Value
1	1	Battery capacity	4	V	2.4	2.4
2	2	Size: length	3	cm	<20	<18
3	2	Size: width/diameter	3	cm	<8	<6

SOME MORE METRICS

Time-to-market

Environment

Users

Storage life

Service life

Product life

Maintenance

Warranty

Shipping size

Packaging

Materials

Manufacturing facility

Prototyping facility

Regulatory environment

Reliability

Patents

Test protocol

Safety

User interface

Mfg cost

End-user price

Delivery time

Bottom line

- ◆ **Have design requirements**
- ◆ **Base them on need**