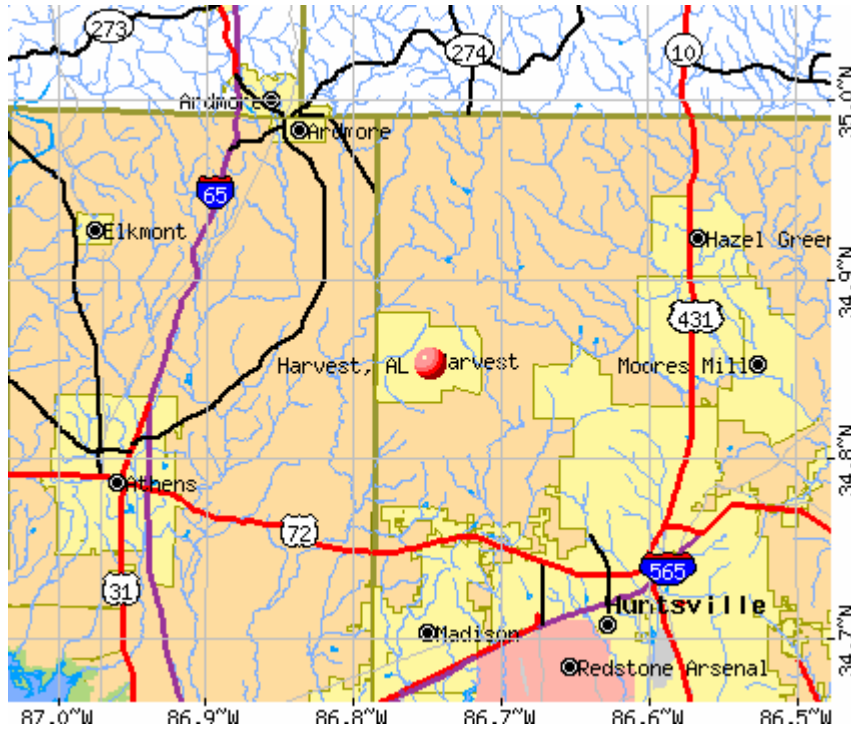


# Smith Residence 596 Orvil Smith Road Harvest, AL 35749

Prepared by: Victor Carroll



## DISCLAIMER

The attached sizing and layout design is for estimation purposes only. The actual size and performance of the system is the responsibility of the installing contractor and design engineer. Unico will only warrant the equipment capacity as shown in the ARI Unitary Directory under the specified conditions when properly installed using all of the installation instructions provided by Unico.

As such, the *UNICOSYSTEM*<sup>®</sup> is a comfort heating and cooling system that has limitations as summarized below. Under certain conditions the system may require the use of special controls.

The following pages summarize the heat gain and heat loss of the building using the ACCA Manual J calculation procedure. The calculations are based on the information given to Unico in the form of drawings, sketches, and interviews. In certain cases, Unico may make assumptions about design conditions that may or may not be accurate for the location of concern. It is the responsibility of the installing contractor to verify the design conditions and to inform the building owner. Unico makes no claim that the information given to us is correct or complete.

## LIMITATIONS

### Ambient conditions:

- -10 to 110°F for the MB blowers (higher temperatures require a cooling tube)
- 32 to 160°F for water coils with standing water
- -10 to 160°F for all other units

### Outdoor Conditions:

- 80 to 110°F for refrigerant cooling systems with air-cooled condensers (use a low ambient head pressure control for lower outdoor temperatures)
- 10 to 50°F for refrigerant heating (heat pump) systems with air-cooled condensers (use the UPC-65 mild weather control kit for higher temperatures)

### Return Air Conditions:

- 72 to 95°F for refrigerant systems
- 32 to 120°F for hydronic systems

### Water temperatures:

- 35 to 200°F except for the M1218 which is limited to 160°F maximum.

### Electric Heaters:

- Refer to installation instructions. Maximum size is limited by airflow, especially for heat pump applications.

Unico warrants that the equipment will operate properly under these conditions. If conditions exceed these limitations, Unico will provide technical advice on the feasibility of adding special controls or modifying the equipment to operate under said conditions. Unless otherwise stated, no express warranty is given for operating the equipment outside of these limitations.

Unico, Inc. is a manufacturer of heating and air conditioning equipment and ductwork. Unico, Inc., is not an architectural or engineering firm and does not provide architectural or engineering plans or diagrams for the public or for use by contractors or construction companies as final “construction documents”

Unico, Inc. works with architectural and engineering firms and with contractors in connection with their designs of heating and air conditioning systems and their specifications for particular applications and buildings, using Unico, Inc.’s equipment and products. Any load calculations, duct design and list of materials and equipment provided in the following pages are based upon information provided by the party referring a particular project to Unico, Inc. (copies of key portions of this material, which provided the basis for the various Design Support information included are attached as part of this package. Any other basic information about this Project used by Unico, Inc. is on file at the Unico, Inc. Customer Service Department under the file number listed).

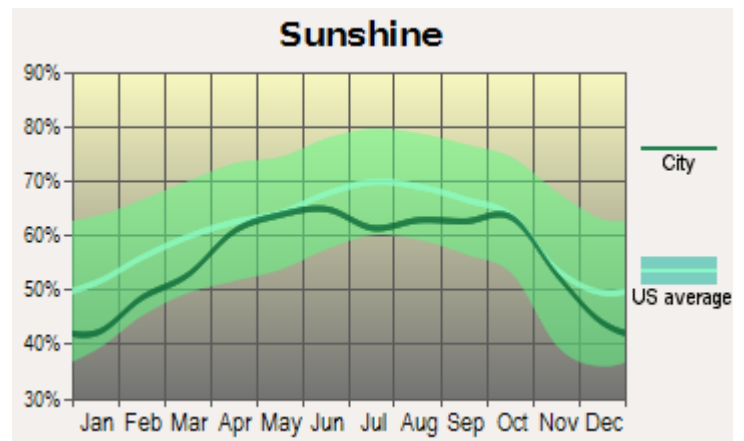
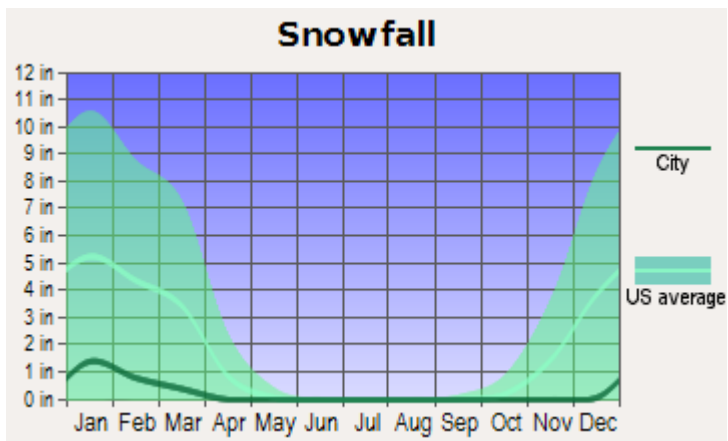
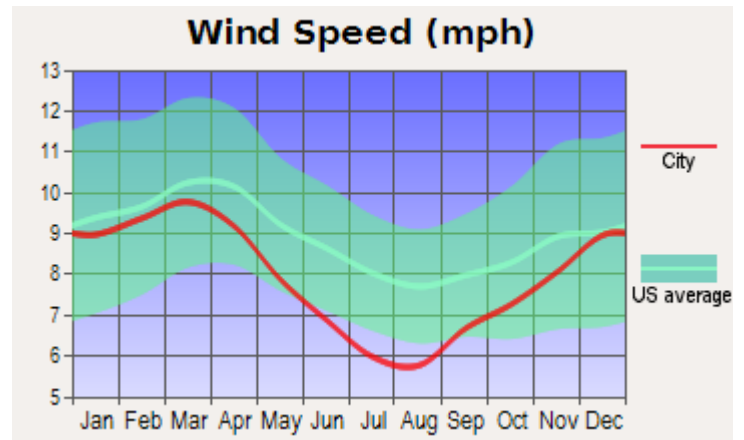
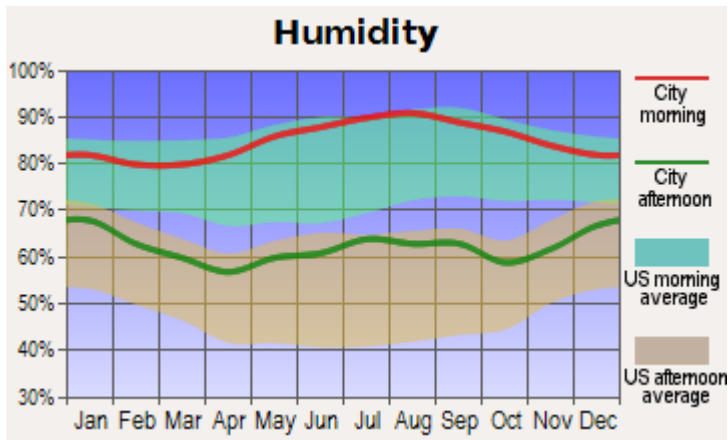
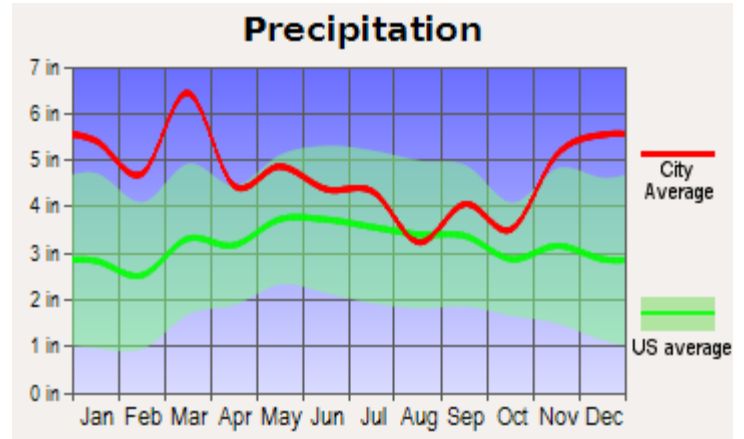
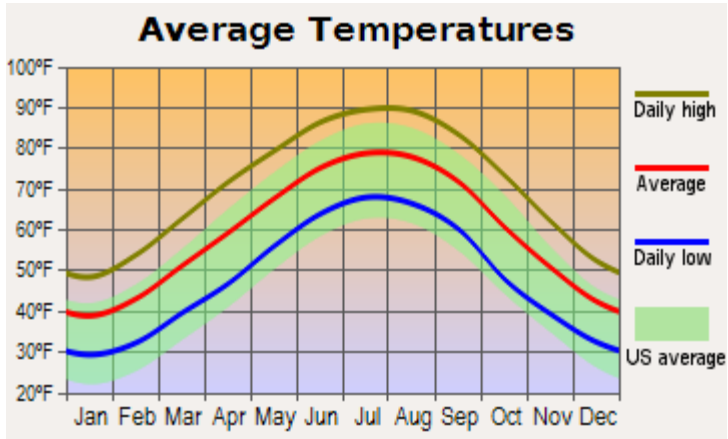
Unico, Inc. has not and does not independently verify that the data provided to Unico, Inc. is correct or complete, and any calculations made by Unico are based upon the information provided by third parties. Various modifications to the information provided to Unico, Inc. may have occurred after this Design Support information was prepared, which would require that this Design Support information be modified in order to be accurate.

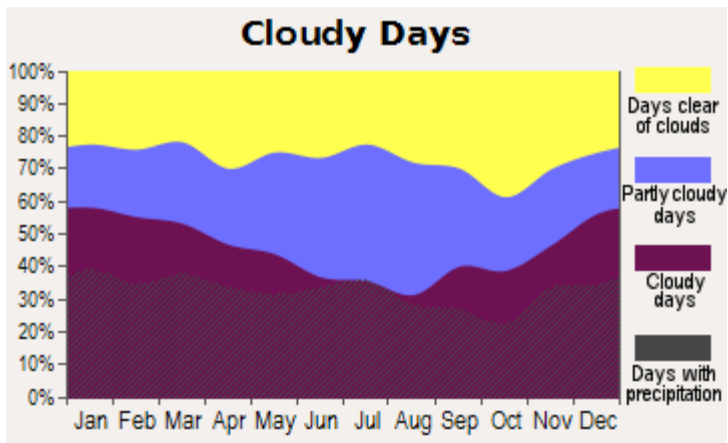
**AS A RESULT, UNICO DOES NOT WARRANT THAT THE EQUIPMENT AND MATERIALS SUGGESTED IN THE FOLLOWING PAGES WILL HEAT OR COOL A PARTICULAR BUILDING TO ANY PARTICULAR LEVEL OF COMFORT, SINCE THAT DETERMINATION IS TO BE MADE BY THE ARCHITECT, ENGINEER OR CONTRACTOR FOR A PARTICULAR PROJECT.**

**UNICO, INC.’S SOLE WARRANTY IS THAT ALL UNICO, INC. EQUIPMENT AND THE UNICO DUCT SYSTEM WILL PERFORM AS RATED, PROVIDED THAT THE INSTALLER OF THE UNICO, INC. EQUIPMENT AND DUCT SYSTEM FOLLOW THE WRITTEN INSTRUCTIONS FOR INSTALLATION PROVIDED BY UNICO, INC. ALL OTHER WARRANTIES ARE EXPRESSLY DISCLAIMED.**

Average climate in Harvest, Alabama

Based on data reported by over 4,000 weather stations





- <http://www.city-data.com/city/Harvest-Alabama.html>

**If the duct layout is altered onsite due to space and/or layout constraints, the Bill of Materials duct length quantities may not be accurate. The DUCT quantities are estimates ONLY. The attached Duct Layout and Bill of Materials are suggestions ONLY. Alterations may be necessary.**

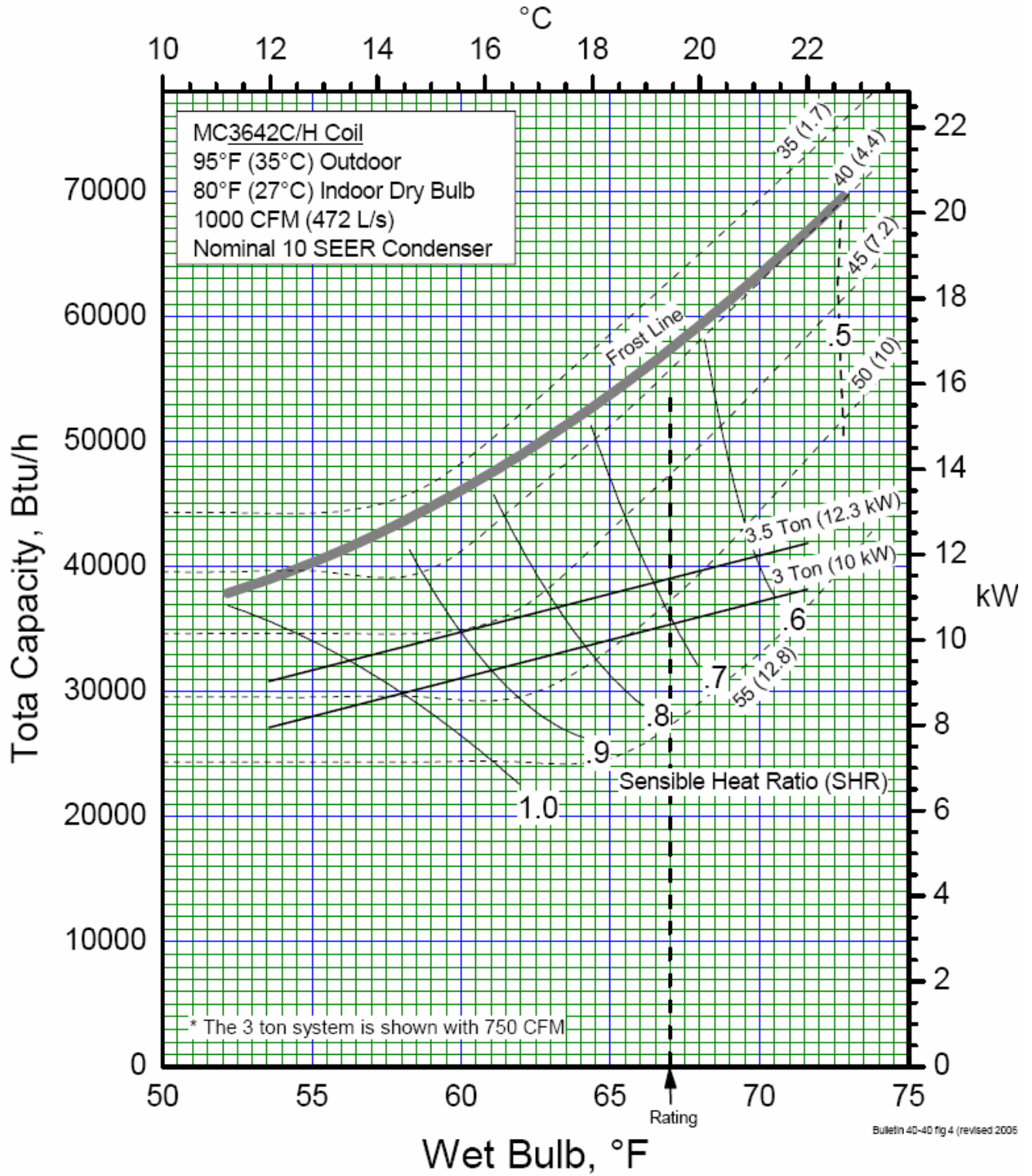
- In bathrooms: do not place outlets above or below the sink, toilet, or shower.
- While placing outlets be aware of how placement may cause draperies and blinds to move. May have to shift outlets to either side of windows.

<b>Bill of Materials:</b>				
<b>Project-1006-011- Orvil Smith Residence</b>				
<b>Item</b>	<b>Quantity</b>	<b>Part Number</b>	<b>Description</b>	<b>U/M</b>
<b>3642 System</b>				
1	1	MB3642L+CB	Module, Blower with Advanced Control Board	each
2	1	MC3642H	Module, Cooling, Heat Pump Coil, R-22	each
3	1	MV3642	Module, Vertical Plenum (includes Spacer Module)	each
4	1	WON1002	Furnace, Electric, 10 kW (matches 2430, 3642, 4860)**	each
5	1	UPC-01-3642	Return Air Box with Grille and Filter, 14" x 30"	each
6	1	UPC-04-3642	Return Air Duct , 18" D x 10 ft.	each
7	1	UPC-104-3642	Return Air Adapter (fits to MH3660, MV3642), for 18" duct	each
8	1	UPC-61-3642	Adapter, Supply, Round, 9", MB3642L	each
9	128	Not A Unico Item	Duct, Sheet Metal Round, 9' ID	feet
10	1	Not A Unico Item	Tee, Full Flow, Sheet Metal Round ,9" ID	each
11	5	Not A Unico Item	Elbow, 90°, Sheet Metal, 9" ID,	each
<b>TOTAL Project</b>				
12	5	UPC-89M-6	Installation Kit, Metal Plenum (6 outlets)	package
13	5	UPC-26CR4-6	Sound Attenuator Tubing, 2" ID x 12'L, R-4.2	package
14	1	UPC-25-R4-4	Supply Tubing, Aluminum, 2" ID x 25'L, R-4.2	package
<b>Optional Items</b>				
15	1	Turbometer	Meter, Air Velocity, Turbo-Meter	each
16	1	UPC-54	Pliers, Clamp	each
17	1	UPC-88-20	Screen, Outlet, White (for outlets located on the floor)	package
18	1	UPC-88-20-BLK	Screen, Outlet, Black (for outlets located on the floor)	package
<b>Extended Warranties</b>				
19	1	EW1	Two to Five Year - Parts Only	
20	1	EW2	Two to Five Year - Parts and 31st Day to Five Year - Labor	
21	1	EW3	Two to Ten Year - Parts Only	
22	1	EW4	Two to Ten Year - Parts and 31st Day to Ten Year - Labor	

## M SERIES COOLING MODULE REFRIGERANT COILS for R-22, R-407C, R-410A



**Figure 1. Refrigerant Cooling Module with cut-away showing coil**



**Load Short Form**  
**Entire House**  
**Unico, Inc.**

Job: 1006-011  
 Date: Oct 31, 2006  
 By: Victor Carroll

7401 Alabama Ave., St. Louis, MO 63111 Phone: 314-481-9000 Fax: 314-457-9000 Email: victor@unicosystem.com Web: www.unicosystem.com

**Project Information**

For: Jed Bartram  
 116 Vasser Circle, Harvest, AL 35749  
 Phone: 256-461-3418 Fax: 256-461-2833  
 Web: Cell # 256-426-6441 Email: bej99@bellsouth.net

**Design Information**

	Htg	Clg	Infiltration	
Outside db (°F)	20	97	Method	Simplified
Inside db (°F)	70	75	Construction quality	Average
Design TD (°F)	50	22	Fireplaces	1 (Average)
Daily range	-	M		
Inside humidity (%)	-	50		
Moisture difference (gr/lb)	-	46		

**HEATING EQUIPMENT**

Make  
 Trade  
 Model  
 Efficiency 80 AFUE  
 Heating input 0 Btuh  
 Heating output 0 Btuh  
 Temperature rise 0 °F  
 Actual air flow 875 cfm  
 Air flow factor 0.024 cfm/Btuh  
 Static pressure 0.00 in H2O  
 Space thermostat

**COOLING EQUIPMENT**

Make  
 Trade  
 Cond  
 Coil  
 Efficiency 0 EER  
 Sensible cooling 0 Btuh  
 Latent cooling 0 Btuh  
 Total cooling 0 Btuh  
 Actual air flow 875 cfm  
 Air flow factor 0.034 cfm/Btuh  
 Static pressure 0.00 in H2O  
 Load sensible heat ratio 0.88

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Mud Room	130	2653	1376	63	47
Utility Room	59	1646	1394	39	48
Kitchen	189	2090	1867	50	64
Dining Room	131	1494	688	36	24
Living Room	420	5699	3606	136	123
Sun Room	180	0	0	0	0
study	192	5112	4196	122	144
Clo#1	43	0	0	0	0
Clo#2	10	0	0	0	0
Bathroom	25	571	286	14	10
Foyer	72	1223	680	29	23
Master Bedroom	160	2179	1514	52	52
Master Bath	75	1901	1222	45	42
Closet	74	0	0	0	0
Clobed#1	30	0	0	0	0
Bedroom#1	273	5610	4196	134	144
.	8	0	0	0	0

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Bath#2	45	1040	480	25	16
..	8	0	0	0	0
Hall	57	0	0	0	0
CLO BEd#2	30	0	0	0	0
Bedroom #2	248	5424	4065	130	139
Entire House	2454	36642	25570	875	875
Other equip loads		2550	1122		
Equip. @ 1.02 RSM			27225		
Latent cooling			3713		
TOTALS	2454	39192	30938	875	875

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**Project Summary**  
**Entire House**  
 Unico, Inc.

Job: 1006-011  
 Date: Oct 31, 2006  
 By: Victor Carroll

7401 Alabama Ave., St. Louis, MO 63111 Phone: 314-481-9000 Fax: 314-457-9000 Email: victor@unicosystem.com Web: www.unicosystem.com

**Project Information**

For: Home Owner  
 116 Vasser Circle, Harvest, AL 35749  
 Phone: 256-461-3418 Fax: 256-461-2833  
 Web: Cell # 256-426-6441 Email: bej99@bellsouth.net  
 Notes: Send project to the rep when it is completed.

**Design Information**

Weather: Huntsville, AL, US

**Winter Design Conditions**

Outside db 20 °F  
 Inside db 70 °F  
 Design TD 50 °F

**Summer Design Conditions**

Outside db 97 °F  
 Inside db 75 °F  
 Design TD 22 °F  
 Daily range M  
 Relative humidity 50 %  
 Moisture difference 46 gr/lb

**Heating Summary**

Structure 34897 Btuh  
 Ducts 1745 Btuh  
 Central vent (47 cfm) 2550 Btuh  
 Humidification 0 Btuh  
 Piping 0 Btuh  
 Equipment load 39192 Btuh

**Sensible Cooling Equipment Load Sizing**

Structure 24352 Btuh  
 Ducts 1218 Btuh  
 Central vent (47 cfm) 1122 Btuh  
 Blower 0 Btuh  
 Use manufacturer's data n  
 Rate/swing multiplier 1.02  
 Equipment sensible load 27225 Btuh

**Infiltration**

Method Simplified  
 Construction quality Average  
 Fireplaces 1 (Average)

	Heating	Cooling
Area (ft <sup>2</sup> )	2016	2016
Volume (ft <sup>3</sup> )	18142	18142
Air changes/hour	0.39	0.16
Equiv. AVF (cfm)	117	48

**Latent Cooling Equipment Load Sizing**

Structure 2270 Btuh  
 Ducts 0 Btuh  
 Central vent (47 cfm) 1442 Btuh  
 Equipment latent load 3713 Btuh  
 Equipment total load 30938 Btuh  
 Req. total capacity at 0.70 SHR 3.2 ton

**Heating Equipment Summary**

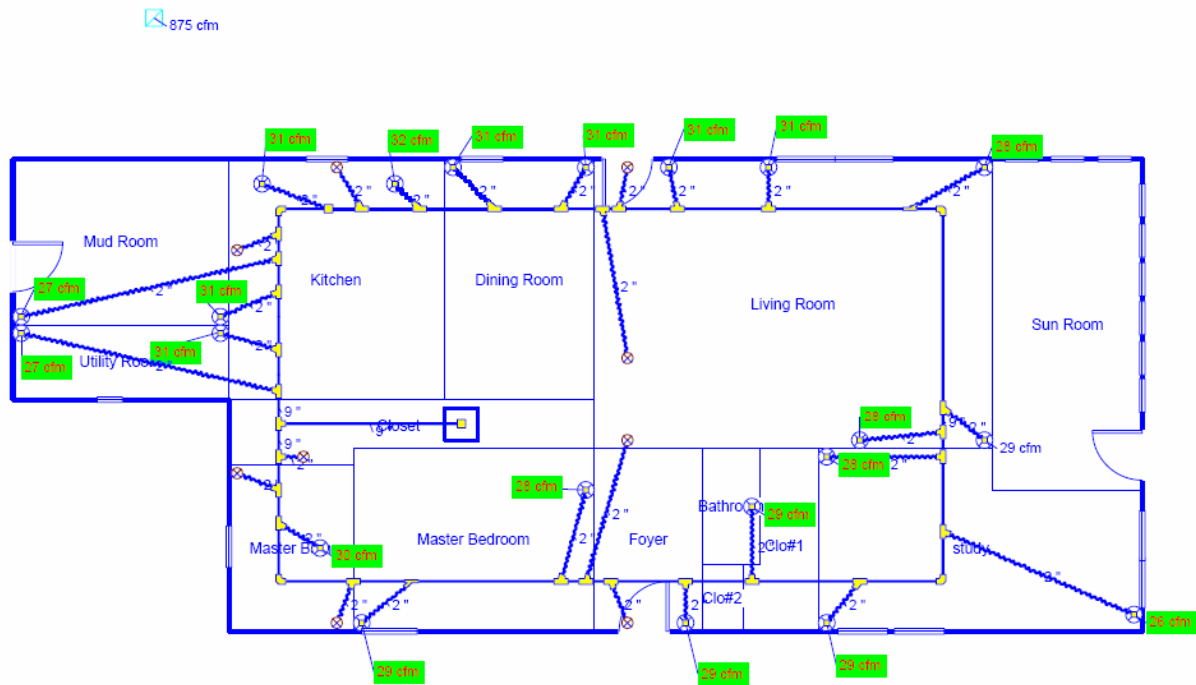
Make  
 Trade  
 Model  
 Efficiency 80 AFUE  
 Heating input 0 Btuh  
 Heating output 0 Btuh  
 Temperature rise 0 °F  
 Actual air flow 875 cfm  
 Air flow factor 0.024 cfm/Btuh  
 Static pressure 0.00 in H2O  
 Space thermostat

**Cooling Equipment Summary**

Make  
 Trade  
 Cond  
 Coil  
 Efficiency 0 EER  
 Sensible cooling 0 Btuh  
 Latent cooling 0 Btuh  
 Total cooling 0 Btuh  
 Actual air flow 875 cfm  
 Air flow factor 0.034 cfm/Btuh  
 Static pressure 0.00 in H2O  
 Load sensible heat ratio 0.88

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Main floor

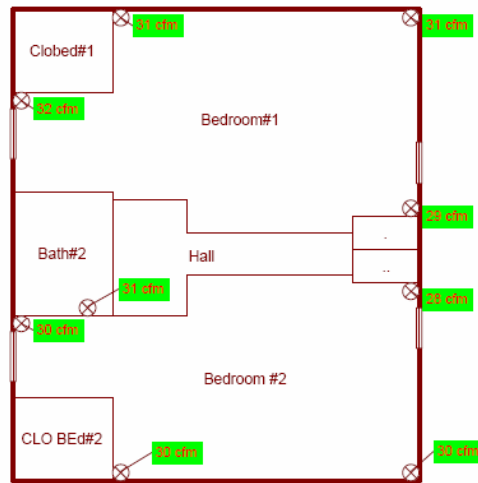


**Job #: 1006-011**  
**Performed by Victor Carroll for:**  
 Jed Bartram  
 116 Vasser Circle  
 Harvest, AL 35749  
 Phone: 256-461-3418 Fax: 256-461-2833  
 Cell # 256-426-6441 bej99@bellsouth.net

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Second Floor



**Job #: 1006-011**  
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