



2013 Labor Installation Standard

Dear NSCA Member:

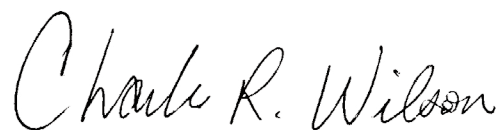
This report has been prepared to assist you in calculating your labor estimates for projects. According to our research, labor variables have become the single biggest risk factor for determining the true cost of each project. Having this document for benchmarking your productivity and efficiency against fellow NSCA Members is an extremely valuable tool. We hope this helps you become more successful and accurate as you prepare your estimates and bids.

This data was compiled from several rounds of surveying our membership. NSCA Members represent the very best of systems integrators and embrace the concept of benchmarking. The preliminary results were analyzed, averaged and rounded. Those results were then further analyzed by a peer review group of subject matter experts to compare with the latest industry best practices, prevailing code requirements, and their own job costing reports.

We have made every effort to produce a useful document for comparing the amount of time your company uses for the installation of equipment with that of the average of other firms throughout North America. Please read the disclaimers and usage guidelines to better understand how this report should be implemented. This document should be used as a guide only. Labor units should be adjusted for the conditions that prevail for each of your projects.

NSCA extends its thanks to the member companies and the individuals that took the time to contribute to this report. Their assistance made this report a highly valuable resource for the entire industry.

Sincerely,



Chuck Wilson
Executive Director
NSCA



Ingolf DeJong
President
NSCA Board of Directors

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Work and Operations Covered by Labor Units

Material Handling

Prior to any equipment being installed, it requires handling several times. For example, the equipment being unloaded from the delivery truck, cartons being opened and the equipment being removed and tested. This requires material handling time before the equipment is installed and must be accounted for. A nominal and typical amount of time at the jobsite is included in these basic labor units.

Drawing and Layouts

Prior to the equipment being installed the installer/technician must become familiar with the equipment and work results at the installation site. Therefore, it is imperative that time is spent examining shop drawings, scope documents and other instructions. This project review time is included in the basic labor units.

Note: this is only the job site portion for review.

Equipment Installation

This portion includes the physical installation of electronic and related equipment in strict compliance with applicable codes, standards, and safety issues. This assumes all miscellaneous parts, tools and equipment are at the job site and installers are trained and operating at full utilization.

Supervision

Project management is an essential aspect of a successful job. For the purposes of this report we have not included the time for general project management or any design modifications. The cost of supervision by a crew foreman, or lead technician is included in the labor units for all size jobs.

Labor Units

The units are based on favorable working conditions, rate of production, and complete installation including furnishing all equipment, connectors, anchors, cable ties, etc. When labor only is furnished, labor units may need to be adjusted upward to compensate for possible unknown conditions.

Degree of Difficulty Variables

Within the survey form, labor units under the **Normal** column are for heights up to 8 feet above a smooth, hard floor. Labor units under the **Difficult** column are for heights up to 12-feet and labor units under the **Very Difficult** column are for heights up to 16-feet. Other examples are noted within.

Adjustment of Labor Units

The labor units may be adjusted for the following reasons:

- a – Productivity, experience and training of the installer/technician
- b – Non-productive labor issues (beyond normal site conditions)
- c – Job factors (i.e. security clearance, safety training, job-specific provisions)

IMPORTANT NOTICE: PLEASE READ CAREFULLY

The following standards, which were established based on a survey of National Systems Contractors Association (NSCA) members, are designed as a resource to the electronic systems industry and the members of NSCA. Please note each of the following instructions and comments before utilizing this standard:

1. This standard should not be viewed as the complete labor guide for everyone. This standard is only provided as a resource to NSCA members, should a member independently determine that it desires to utilize a survey of this type. All or part of the contents of this survey may not fit with or be applicable to you or your company's situation.
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3. This notice and the instructions contained herein are in addition to, and not in lieu of, the "copyright and trademark notice" and the "legal notice and disclaimer" found at the bottom of this page, and shall not be deemed to limit or amend such notices and disclaimer.

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ACCESS CONTROL

Installation Items	Additional Description	Labor Hours		
		Programming	Normal	Difficult
Controller				
CPU/Computer		4.07	2.97	3.24
Install Software	Proprietary	1.84	1.82	2.34
Install Software	Mac or Windows Based	1.67	2.44	3.41
Programming		5.06	N/A	N/A
Computer Hookup/Setup	For Use with Access Prog.	N/A	2.68	3.89
Build Card Database in Existing Software	Per 10 Cards*	2.17	1.99	2.16
Layout Artwork	Photo Badging/Logo Cards	N/A	3.99	4.52
Print Badging/Cards on Local Printer	Per 10 Cards	1.50	1.20	1.46
Program Cards	Each	0.21	0.30	0.39
Upload System Data to Remote Panels		1.50	1.10	1.14
Client Work Station		N/A**	3.00	3.74
Access Control Panel				
Control Panel	1 Reader	1.98	2.10	N/A
Control Panel	2 Reader	2.36	3.41	4.28
Control Panel	4 Reader	3.25	5.34	6.22
Control Panel	8 Reader	4.83	7.89	8.90
Control Panel	8 to 16 Reader	7.19	11.67	12.73
Card Reader	Standalone	2.22	2.52	3.98
Power Supply (12VDC)		N/A	1.26	1.54
Power Supply (24VDC)		N/A	1.26	1.54
Battery Back-Up		N/A	0.70	1.04
Elevator Interface-Relay Based	Driven by Controller Panel	1.00	2.72	3.39
Input Control Board		N/A	1.98	N/A
Output Control Board		N/A	1.97	N/A
Door Access Devices				
Card Reader (prox, swipe or touch pad)	Wall Mounted	0.54	1.20	1.50
Card Reader (prox, swipe or touch pad)	Post Mounted	0.54	1.66	1.74
Reader/Door Controller		2.69	2.01	2.29
Palm/Finger Print/Iris Biometric Reader		1.13	1.58	1.64
Door Contacts		N/A	1.05	1.19
Request-to-Exit Motion Detector		0.83	1.30	1.56
Telephone Door Entry Security		2.17	2.38	3.00
Remote Intercom Unit		N/A	1.48	1.84
Door Lock Devices				
Door Strike	Electric - New	N/A	2.28	2.56
Door Strike	Electric - Retrofit	N/A	2.43	2.94
Mortice Lock	Electric - New	N/A	2.70	2.89
Mortice Lock	Electric - Retrofit	N/A	2.73	3.01
Electric Hinge		N/A	1.89	2.31
Door Lock	Touchpad - New	N/A	2.32	2.73
Door Lock	Touchpad - Retrofit	N/A	2.52	3.11
Mag-Lock (Single Door)		N/A	3.02	4.48
Mag-Lock (Double Door)		N/A	4.98	7.47
Mag-Lock	Emergency Door, 15 Sec. Delay	N/A	5.02	7.51
RIM Lock		N/A	2.03	3.02
Push Bar Exit Device		N/A	3.07	4.49
Push Bar Exit Device	Electrified w/Power Supply	N/A	5.97	8.96
Miscellaneous				
Door Lock Protector		N/A	0.87	1.48
Key Switch		N/A	0.93	1.55
Door Closer		N/A	1.95	2.13
NEMA Enclosure		N/A	1.20	1.65
Relay/Sockets		N/A	0.84	1.08
Motion Sensor		N/A	1.00	1.39
Bell/Horn		N/A	1.01	1.28
Emergency Door Release	Push Button	N/A	1.00	N/A
Surge Protector		N/A	0.51	N/A

* Programming is for database set up, labor is for entering data.

** Programming included in labor hours.

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Examples: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming and in facilities that require heightened security procedures.

Note: Labor hours include handling and unpacking of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc. For wiring see Cabling on page 8.

AUDIO/ SOUND REINFORCEMENT

Installation Items	Additional Description	Commissioning & Programming	Labor Hours		
			Normal	Difficult	Challenging
Digital Signal Processing					
Digital Signal Processor (DSP)		3.93	2.63	5.02	N/A
DSP I/O Interface		4.02	2.75	4.03	N/A
DSP Computer/Software		4.13	3.69	6.01	N/A
Mixing Console					
Mixing Console (1-8 inputs) - Analog	Rack/Desk Mounted	1.62	2.60	3.06	N/A
Mixing Console (8-16 inputs) - Analog	Rack/Desk Mounted	2.18	4.09	4.83	N/A
Mixing Console (8-16 inputs) - Digital	Rack/Desk Mounted	2.25	4.16	4.65	N/A
Mixing Console (17-32 inputs) - Analog	Desk Mounted	3.30	5.91	6.08	N/A
Mixing Console (17-32 inputs) - Digital	Desk Mounted	3.32	5.79	6.09	N/A
Mixing Console (32+ inputs) - Analog	Desk Mounted	4.84	7.17	8.54	N/A
Mixing Console (32+ inputs) - Digital	Desk Mounted	4.80	7.25	8.40	N/A
Audio Components					
Equalizer	Digital	1.59	1.70	1.75	N/A
Equalizer	Analog	1.35	1.62	1.86	N/A
Compressor/Limiter	Digital	1.16	1.38	1.92	N/A
Compressor/Limiter	Analog	1.13	1.37	1.75	N/A
Ambient Sensing		2.28	1.80	2.75	N/A
Automatic Mic Mixer (1-8 Inputs)		2.01	1.75	2.20	N/A
Power Amplifier		1.03	1.31	1.75	N/A
Wired Microphone		N/A	0.21	1.15	N/A
Microphone Outlet		N/A	0.95	1.69	N/A
Microphone Table Top		N/A	0.28	0.97	N/A
Wireless Microphone		0.13	0.21	1.02	N/A
Remote Antennas	Wireless Mic	N/A	0.47	3.33	N/A
Digital Snake		0.23	0.49	3.50	N/A
Speakers					
Speakers					
Wall Speaker	Surface Mount	N/A	1.42	1.48	1.54
Wall Speaker	Flush Mount	N/A	1.60	1.63	1.70
Ceiling Speaker	Surface Mount	N/A	1.48	1.55	1.61
Ceiling Speaker	Flush Mount	N/A	1.38	1.43	1.48
Monitor Speaker		N/A	1.28	1.28	1.24
Speaker Clusters, Array, 2-3 Box					
Speaker Clusters, Array, 2-3 Box	Without Built-In Attachment Point				
Box Speaker	<40#	N/A	4.10	4.46	4.98
Box Speaker	>40#	N/A	4.35	4.81	5.21
L F Speaker/1 H F Horn		N/A	4.05	4.54	4.97
L F Speaker/2 H F Horn		N/A	4.65	4.75	6.13
L F Speaker/3 H F Horn		N/A	4.78	5.80	7.98
Speaker Clusters, Array, 2-3 Box					
Speaker Clusters, Array, 2-3 Box	With Built-In Attachment Point				
Box Speaker	<40#	N/A	3.01	3.24	4.00
Box Speaker	>40#	N/A	3.41	3.69	4.86
L F Speaker/1 H F Horn		N/A	3.67	4.50	5.10
L F Speaker/2 H F Horn		N/A	4.54	5.06	6.02
L F Speaker/3 H F Horn		N/A	4.88	5.60	6.88

Programming involves creating the user presets and default settings, saving and storing the files. Commissioning is the final installation, set up and training.

Normal - Basic install and design, can be done from step ladder.

Difficult - Examples: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures, requires extension ladder.

Challenging - Examples: padded ceiling with multiple obstructions, requires a lift.

Note: Labor hours includes handling and unpacking of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc. For wiring see Cabling on page 8.

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Cable Installation				
Single Cable 1-8 pair	per 100'	1.00	1.57	2.26
Single Cable 8-24 pair	per 100'	1.09	1.72	2.45
Single Cable 25 pair	per 100'	1.36	2.13	2.73
Single Cable 50 pair	per 100'	1.63	2.43	3.17
Single Cable 100 pair+	per 100'	2.09	3.18	4.10
Two-to-Four Cables 1-8 pair	per 100'	1.67	2.42	3.26
Five + Cables 1-8 pair	per 100'	2.24	2.85	3.93
Cable Installation				
Single Cable Coax	per 100'	0.97	1.53	2.19
Two-to-Four Cables Coax	per 100'	1.33	1.99	2.66
Five + Cables Coax	per 100'	1.81	2.58	3.18
Pre-Terminated Cable Installation				
HDMI/DVI/VGA	per 50'	0.52	1.49	2.21*
Component/S-Video/Composite	per 50'	0.50	1.46	2.18*
Termination				
		Cable Only	Existing box	Requires new box
Category Cable Termination	Remote End	0.40	0.51	0.98
Category Cable Termination	Head-End	0.52	N/A	N/A
25 Pair (per end)		1.63	2.03	2.53
Coax	"F" Style	0.27	0.29	0.62
Coax	BNC	0.30	0.33	0.68
Audio Cable	XLR	0.38	0.42	0.72
Audio Cable	RCA	0.33	0.36	0.68
Audio Cable	Mini	0.25	0.29	0.52
Install Punch Block (66)	25pair	1.08	1.31	1.72
Install Patch Panel (RJ45)	24port	1.63	N/A	N/A
Testing				
Cat-5		0.55	N/A	N/A
Cat-6		0.60	N/A	N/A
25 pair		1.11	N/A	N/A
Coax	OTDR	0.60	N/A	N/A

* Difficult and Challenging assumes obstructions and a difficult bend radius.

Normal - Example: suspended ceiling.

Difficult - Examples: no conduit/raceway not provided, above normal ceiling height.

Challenging - Examples: no conduit/raceway not provided, lift required, limited access ceiling.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming.

For healthcare facilities specifying CDC guidelines for dust containment and infectious control, add 35% to the challenging column figure.

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Accessories				
TV Receptacle		0.56	0.89	1.50
Splitter/Directional Coupler		0.52	0.67	0.84
Head End Equipment (passive devices)		3.29	4.35	6.23
QAM Modulator		0.94	1.89	2.92
QAM Demodulator		0.97	1.92	2.97
Broadband Amplifier		0.94	1.83	2.78
Satellite Receiver		0.93	1.91	2.99
Multiplexer		1.02	1.99	3.01
Antenna/Satellite Dish				
		Pole mount	Roof mount	Inclement Weather
Antenna (off-air)		3.41	3.91	5.59
Satellite Dish	18" (DSS - LNB Included)	1.98	2.82	4.71
Satellite Dish	4' (LNB Included)	3.75	4.83	6.26
Satellite Dish	6' (LNB Included)	4.48	5.52	7.10
Satellite Dish	8' (LNB Included)	5.61	6.52	8.33

For displays see Video on page 23.

Normal - Example: connecting to a single monitor.

Difficult - Example: distribute to multiple rooms/devices.

Challenging - Examples: integrate multiple video sources; remodulate and distribute.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

For wiring see Cabling on Page 8.

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Controller				
CPU/Computer		0.55	0.89	N/A
Software Load		0.48	1.64	N/A
Programming		2.12	4.05	N/A
Computer Hookup/Setup	For Use with CCTV Prog.	0.41	0.79	N/A
Install Software	DOS/Windows Based	0.52	1.75	N/A
Camera Programming	Each Camera	0.10	0.14	N/A
Viewing Station (passive - no control)		1.05	1.31	N/A
Mounting				
Power Bracket		1.02	1.44	1.78
Camera Control Unit		1.66	2.18	2.78
Mount	Standard	0.84	1.24	1.70
Mount	Swivel	0.97	1.35	2.61
Mount	Tamper-Proof	1.16	1.58	2.13
Mount	Automatic Pan	1.60	2.07	2.86
Mount	Corner	1.41	1.91	2.47
Mount	Parapet	2.10	3.12	3.92
Mount	Pole Mount - 20 Ft Max	3.48	4.89	5.26
Camera and support bracket				
		<i>Step Ladder</i>	<i>Ext. Ladder</i>	<i>Lift</i>
Indoor Camera	Fixed	1.22	1.58	2.11
Indoor Camera	Pan/Tilt	2.01	2.50	3.15
Indoor Camera and Housing	Fixed	1.72	2.16	2.65
Indoor Camera and Housing	Pan/Tilt	2.40	3.00	3.67
Outdoor Camera with Housing	Fixed	2.23	2.85	3.55
Outdoor Camera and Housing	Pan/Tilt	3.01	3.66	4.47
Indoor Dome Camera	Fixed	1.75	2.34	2.89
Indoor Dome Camera	Pan/Tilt	2.25	2.91	3.65
Outdoor Dome Camera	Fixed	2.65	3.51	4.39
Outdoor Dome Camera	Pan/Tilt	3.39	4.37	5.37
Heater		0.59	0.85	1.15
Blower		0.63	0.83	1.16
Sun-Shroud		0.62	0.98	1.22
Wiper		0.76	1.05	1.32
IP Camera	Set IP address	0.35	0.49	N/A
Indoor Mini Dome Camera		1.21	1.75	2.03
Outdoor Mini Dome Camera		1.75	2.86	3.30
Monitor				
Monitor Bracket	Wall	1.34	1.98	2.62
Monitor Bracket	Ceiling	1.78	2.41	3.32
Monitor in Rack	Install	1.02	1.45	1.97
Monitor in Rack	Fabricate	1.98	2.92	3.67

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Accessories				
Digital Video Recorder - DVR	Desktop	1.11	1.59	2.05
Digital Video Recorder - DVR	Rackmount	1.46	2.06	2.62
Network Video Recorder - NVR		1.37	2.20	2.81
Server Build Up		1.24	2.12	N/A
Storage Area Network - SAN		1.89	2.46	N/A
Distribution Amplifier		1.18	1.46	1.88
Remote Control Box (Pan/Tilt/Zoom/Focus)	Desktop	1.57	2.02	2.37
Remote Control Box (Pan/Tilt/Zoom/Focus)	Rackmount	1.76	2.04	2.43
Remote Power Supply		1.07	1.61	1.84
Switcher	Desktop	1.56	1.93	2.49
Switcher and Mounting Bracket	Rackmount	1.96	2.49	2.90
Coax Surge Suppressor		0.64	0.89	1.08
Console		2.90	3.86	4.90
Pan/Tilt Zoom Lens Control		1.61	2.53	2.78
Time/Date/Character Generator		1.37	1.79	2.20
Digital Motion Detector		1.35	1.95	2.44
Video Processor	4 Inputs	1.75	2.05	2.60
Alarm Interface		1.77	2.12	2.64
Programming	Per Channel	0.68	1.34	1.62
IP Encoder		0.53	N/A	N/A
Camera Lenses				
Fixed		0.53	0.65	0.99
Auto Iris		0.65	0.90	1.37
Zoom		0.87	1.03	1.16
Add or Replace Lens		0.75	1.22	1.62

Normal - Examples: install camera from step ladder, easy access to work location.

Difficult - Examples: install camera from lift or extension ladder, difficult access to work spaces.

Challenging - Examples: install camera with high lift outdoors in obscure area (e.g. edge of roof) and/or incompatible equipment, high security venues or challenging weather conditions.

Note: Labor hours includes handling and unpacking of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc. For wiring, see the section on Cabling.

CLOCKS

Installation Items	Additional Description	Labor Hours	
		Normal	Difficult
Master Clock			
Single Circuit Controller & Programming	Flush	3.58	4.87
Single Circuit Controller & Programming	Surface	3.15	4.43
Multi Circuit Controller & Programming	Flush	5.03	6.65
Multi Circuit Controller & Programming	Surface	5.04	6.79
Wireless Master		5.80	8.08
Secondary Clock			
Secondary Clock	Digital	0.80	1.36
Secondary Clock	Analog	0.85	1.24
Secondary Clock	with Wire Guard	0.71	1.18
Secondary Clock and Speaker	with Wire Guard	0.90	1.43
Secondary Clock and/or speaker with	Digital	1.60	1.89
Backbox		1.59	2.01
Secondary Clock and/or speaker with	Analog	1.04	1.38
Backbox		0.99	1.14
Elapsed Time Clock		0.50	0.99
Elapsed Time Control		0.49	1.07

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Example: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

DIGITAL SIGNAGE

Installation Items	Additional Description	Labor Hours	
		Normal	Difficult
Content Server			
Install & Configuration	Furnished by others (IT)	6.07	7.15
Content Design Services and Programming	Basic	7.98	9.25
RSS Feed Capability	Connectivity only	1.10	1.65
Streaming Video	Connectivity only	1.01	1.74
Database Integration	Furnished by others (IT)	4.88	6.53
Wayfinding	Implementation per location	3.10*	4.17*
Player Install			
Wired Configuration		1.52	2.03
Wireless Configuration		1.40	2.30
Owner Network Configuration	Furnished by others (IT)	1.88	2.71
AntiVirus Installation	Furnished by others (IT)	1.56	1.88
Update Media Player Software		1.51	2.56
Add Coaxial TV Input		1.38	2.19
Multiple Display Output		2.66	3.07
Display Install			
Mobile/Fixed Kiosk ≤ 46"		3.75	6.35
Mobile/Fixed Kiosk > 46"		4.12	6.87
Custom Kiosk/Display ≤ 46"		5.86	7.89
Custom Kiosk/Display > 46"		6.23	8.01

* Graphics/design furnished by others.
For display see Video on page 26.

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Example: Installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

EQUIPMENT RACKS/ CABINETS/ WALL PLATES

Installation Items	Additional Description	Labor Hours	
		Normal	Difficult
Equipment Racks & Cabinets			
Field Installation	Floor Mount 42"-77"	2.80	3.58
Blank Panels	Each	0.34	0.67
Ventilation Panel /Fan	Each	0.58	0.84
Power Strip	Each	0.71	0.97
AC Power Panel/Sequencer		0.90	1.18
Wall Equipment Cabinet	28" or Less	2.05	3.08
Wall Equipment Cabinet	Over 28"	2.82	3.97
Wall Plates & Floor Boxes			
Audio	≤ 2 connections per gang	0.62	1.41
Audio	> 2 connections per gang	1.20	1.45
Network	≤ 2 connections per gang	0.98	1.32
Network	> 2 connections per gang	1.40	1.68
Video	≤ 2 connections per gang	0.60	1.25
Video	> 2 connections per gang	0.90	1.41

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Example: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Note: Labor hours includes handling and unpacking of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

FIBER OPTICS

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Fiber Optic cable Pulling				
2-6 Strand in Conduit	per 100'	1.24	1.93	3.16
2-6 Strand in Cable Tray	per 100'	1.27	2.09	3.53
2-6 Strand in Inner-Duct	per 100'	1.04	1.71	3.05
12-36 Strand in Conduit	per 100'	1.59	2.60	3.87
12-36 Strand in Cable Tray	per 100'	1.60	2.70	4.13
12-36 Strand in Inner-Duct	per 100'	1.38	2.39	3.62
12-36 Strand Self Supporting (rings)	per 100'	2.40	3.62	5.10
48+ Strand in Conduit	per 100'	1.83	2.97	4.33
48+ Strand in Cable Tray	per 100'	1.84	3.06	4.59
48+ Strand in Inner-Duct	per 100'	1.59	2.64	4.04
Inner-Duct Placement				
Inner-Duct	per 100'	2.66	3.04	3.77
Termination MultiMode				
Breakout Kit 6 Strand	per end	1.20	2.90	3.41
Breakout Kit 12 Strand	per end	1.93	3.89	4.91
ST Termination	per connector	0.40	0.92	1.62
SC Termination	per connector	0.39	0.88	1.59
FC Termination	per connector	0.61	0.92	1.59
SMA Termination	per connector	0.74	1.07	1.52
Fusion Splicing	per strand	0.74	1.28	1.81
Termination SingleMode				
Breakout Kit 6 Strand	per end	1.34	3.10	3.66
Breakout Kit 12 Strand	per end	1.96	3.24	4.41
Breakout Kit 24 Strand	per end	2.96	3.56	5.66
ST Termination	per connector	0.43	0.92	1.84
SC Termination	per connector	0.42	0.92	1.84
FC Termination	per connector	0.63	0.92	1.84
SMA Termination	per connector	0.78	1.07	1.84
Fusion Splicing	per strand	0.73	1.28	1.81
HardWare				
Wall Mount LIU (Lightguide Interface Unit)	6-12 port	1.25	2.45	3.52
Wall Mount LIU (Lightguide Interface Unit)	12-24 port	1.52	2.95	4.02
Wall Mount LIU (Lightguide Interface Unit)	36+ port	2.00	3.85	4.70
Rack Mount LIU (Lightguide Interface Unit)	6-12 port	1.22	2.35	3.39
Rack Mount LIU (Lightguide Interface Unit)	12-24 port	1.57	3.15	4.14
Rack Mount LIU (Lightguide Interface Unit)	36+ port	2.07	4.15	4.64
Rack Mount Splice Center		1.17	2.92	3.85
Splice Capsule	3-Tray	1.61	3.19	4.13
Splice Capsule	6-Tray	1.68	3.19	4.25

FIBER OPTICS CONTINUED

Installation Items		Labor Hours		
		Testing	Documentation	
Testing		Average	Average	
Single Mode One Direction Per Strand	OTDR	0.44	0.63	N/A
Multi Mode One Direction Per Strand	OTDR	0.44	0.63	N/A
Single Mode One Direction Per Strand	Power Meeter	0.50	0.51	N/A
Multi Mode One Direction Per Strand	Power Meeter	0.50	0.51	N/A
Single Mode Splice Loss	OTDR	0.54	0.63	N/A
Multi Mode Splice Loss	OTDR	0.69	0.97	N/A

Normal - Example: suspended ceiling.

Difficult - Examples: no conduit/raceway not provided, above normal ceiling height.

Challenging - Examples: no conduit/raceway not provided, lift required, limited access ceiling.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

FIRE ALARM

Installation Items	Additional Description	Labor Hours			
		Programming	Normal	Difficult	Challenging
Controllers					
4 Zone		1.54	2.61	3.13	4.01
8 Zone		1.85	3.53	4.08	5.25
12 Zone		2.84	4.66	4.99	6.32
24 Zone		4.38	6.28	6.47	8.53
48 Zone		7.33	9.38	9.61	11.81
Addressable Controller		3.74	5.29	5.83	7.94
Battery, With Rack		N/A	1.43	1.91	2.61
Battery Charger		N/A	1.37	1.51	2.14
Relay		1.39	0.91	1.10	1.41
Test Switch		1.00	0.92	1.05	1.44
Remote Annunciator		1.45	0.98	1.09	1.47
Fireman's Phone		1.25	1.21	1.48	1.94
Digital Communicator		1.61	1.81	2.27	2.87
Remote Interface		2.14	1.58	1.82	2.46
Function Circuit Card		1.11	1.30	1.69	2.28
Annunciators					
8 Zone		1.00	1.90	2.95	3.88
12 Zone		1.37	2.10	3.12	4.87
16 Zone		1.74	2.26	3.00	4.21
24 Zone		2.14	2.67	3.44	4.39
48 Zone		3.32	3.24	4.35	5.28
Addressable Annunciators		1.98	2.13	2.33	3.01
Detection Device					
Heat Detector	Hours Conventional	N/A	0.99	1.10	1.30
Heat Detector	Hours Addressable	0.47	0.93	1.12	1.32
Smoke Detector	Hours Conventional	N/A	1.03	1.18	1.45
Smoke Detector	Hours Addressable	0.47	0.97	1.21	1.49
Duct Smoke Detector	Hours Conventional	N/A	1.91	2.00	2.28
Duct Smoke Detector	Hours Addressable	0.50	1.95	2.13	2.49
Manual Pull Station	Hours Conventional	N/A	1.01	1.36	1.59
Manual Pull Station	Hours Addressable	0.47	0.97	1.36	1.61
Explosion Proof Pull Station		N/A	1.59	1.81	2.21
Remote Test Station		N/A	0.93	1.22	1.58
Remote LED Detector		N/A	0.84	1.12	1.46
Signaling Devices					
Horn		N/A	1.01	1.13	1.44
Weatherproof Horn		N/A	1.27	1.32	1.65
Amplified Horn		N/A	1.08	1.35	1.75
Horn/Strobe		N/A	1.21	1.47	1.69
Bell		N/A	1.03	1.16	1.48
Weatherproof Bell		N/A	1.20	1.26	1.58
Audio/Visual		N/A	1.03	1.18	1.47
Strobe Light		N/A	1.05	1.15	1.44
Explosion Proof Strobe Light		N/A	1.66	1.67	2.05
Rotating Beacon		N/A	1.48	1.61	1.98
Speaker 8 Inch	Ceiling	N/A	1.07	1.50	1.86
Speaker 4 Inch	Wall	N/A	0.99	1.36	1.56
Speaker/Strobe		N/A	1.15	1.28	1.59

FIRE ALARM CONTINUED

Installation Items	Additional Description	Labor Hours			
		Programming	Normal	Difficult	Challenging
Miscellaneous					
Magnetic Door Release		N/A	1.26	1.68	2.09
PC Configuration					
Printers		N/A	1.58	1.94	2.41
Keyboard and Monitor		N/A	1.61	1.90	2.35
Graphics PC		N/A	0.32	N/A	N/A
Software		2.00	N/A	N/A	N/A
Control Panel Modules					
Control Relay Module		N/A	0.94	1.10	1.37
4 Circuit Signal Module		N/A	1.10	1.25	1.61
Panel Mount Control Switch		N/A	0.92	1.25	1.72
Power Supply - 6 Amps		N/A	1.17	1.58	2.10
Voice Telephone Command		N/A	1.99	2.53	3.15
Master Firefighters Telephone		N/A	1.64	2.01	2.57
30 to 80 Watt Amplifier		N/A	1.46	1.80	2.21
80 to 250 Watt Amplifier		N/A	1.87	1.86	2.28
Audio Message Generator		N/A	1.92	1.88	2.25
Fire Alarm Devices					
Guard for Stations		N/A	0.72	0.92	1.25
Pressure Switch - No Plumbing		N/A	1.11	1.36	1.61
Fire Fighter Phone		N/A	1.09	1.27	1.63
Fire Fighter Phone Jack		N/A	0.94	1.05	1.33
4PSDT Relay/Surface Mount Enclosure		N/A	0.95	1.19	1.44
Magnetic Door Release		N/A	1.19	1.34	1.72
Flow Switch - No Plumbing		N/A	1.20	1.35	1.64
Tamper Switch		N/A	1.14	1.28	1.55
Adapter Plate		N/A	0.52	0.73	0.95
Trim Plate		N/A	0.50	0.70	0.89
Addressable Device (remote)		0.75	0.94	1.03	1.31
Keyboard and Monitor		N/A	1.79	2.11	2.57

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Examples: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Challenging - Examples: padded ceiling with multiple obstructions, requires a lift.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

INDUSTRIAL/COMMERCIAL SOUND

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Intercom - Master Station				
Master Assembly	Desk Top	2.61	3.50	3.90
Master Assembly	Rack	3.17	3.98	4.43
Termination	Per Room	0.69	1.13	1.51
Remote Station				
Call switch	Existing Box	0.68	0.96	1.37
Call Switch	Drywall Ring Only	1.24	1.54	2.25
Amplifiers/Mixers				
Package Amp/Mixer	Shelf Mounted	1.53	1.78	2.50
Package Amp/Mixer	Rack Mounted	1.50	1.76	2.35
Modular Package Amp/Mixer	Shelf Mounted	1.71	2.20	2.89
Modular Package Amp/Mixer	Rack Mounted	1.72	2.04	2.59
Module - Insert & Connect		0.65	0.99	1.29
Power Amplifier	Rack Mounted	1.15	1.40	1.70
Wall Amplifier		2.27	3.17	4.23
Program Source				
Tuner, Tape, Radio, CD Player etc..		0.96	1.29	1.94
Telephone Line Paging		0.95	1.54	2.19
Signal Processor				
Equalizer	Install & Connect	1.32	1.93	2.68
Equalizer	Setup Equalization	1.92	2.15	2.96
Compressor/Limiter	Install/Setup	1.19	1.59	2.14
Ambient Sensing	Auto Level Set	1.63	2.25	3.08
Zone Switching	Manual	1.29	2.02	3.06
Zone Switching	Relay	1.62	2.41	3.59
Microphone		0.72	1.14	1.53
Microphone Outlet		0.86	1.23	1.68
Digital Page Delay		1.19	1.61	2.15

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Examples: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Challenging - Examples: padded ceiling with multiple obstructions, requires a lift.

Note: Labor hours includes handling and unpack aging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

NETWORKING

Installation Items		Labor Hours				
Hubs	Additional Description	Ethernet	Token Ring	Other		
Non-Stackable		0.39	0.52	0.45		
Non-Stackable w/ Built in Management		0.47	0.58	0.70		
Non Stackable w/ Add in Management Module		0.65	0.95	0.74		
Stackable		0.48	0.70	0.69		
Stackable w/ Built in Management		0.57	0.75	0.80		
Stackable w/ Add in Management Module		0.75	1.00	1.13		
Up Link Modules		0.37	0.44	0.35		
Switches	Additional Description	Ethernet	Gigabit	Token Ring	ATM	
Non-Stackable		1.00	1.55	1.40	1.60	
Non-Stackable w/ Built in Management		1.22	1.80	1.54	1.85	
Non Stackable w/ Add in Management Module		1.48	1.89	1.95	2.25	
Stackable		1.23	1.90	1.75	2.37	
Stackable w/ Built in Management		1.32	1.80	1.72	2.40	
Stackable w/ Add in Management Module		1.58	2.45	2.25	2.44	
Up Link Modules		0.49	0.45	0.66	0.67	
Enterprise Chassis		1.82	1.83	1.65	1.75	
Switch Fabric		2.20	2.10	2.13	2.05	
Interface Module		0.39	0.65	0.55	0.79	
Layer 3 Switching / Routing		3.15	3.20	3.02	3.66	
Trunking, STP, Redundant Links		2.88	2.65	2.71	2.60	
Vlan Implementation		2.55	2.40	2.52	2.62	
Labor Hours						
Routers	Chassis	Frame	Ethernet	Gigabit	Token Ring	ATM
Boundary Router	1.12	1.00	2.79	3.33	3.15	3.87
Mid-Tier Router	1.00	1.10	3.30	3.50	3.30	4.00
Layer 3 Switching / Routing	0.88	0.92	3.80	4.44	4.12	5.00
Vlan Implementation/Vlan Routing	0.74	0.95	3.75	4.04	4.25	4.63
Enterprise Router	1.50	0.86	6.05	5.87	6.50	6.23
Interface Card	0.75	1.05	1.20	1.20	1.13	0.74
Layer 3 Switching / Routing	0.88	1.00	3.79	4.00	3.66	4.16
Vlan Implementation/Vlan Routing	1.10	0.89	6.00	6.05	6.20	5.48
Network Management	Software					
Operating System (Built In)	2.50					
Windows-Based	4.35					
Proprietary Operating System	3.87					
Wireless Network						
Access Points			1.10			
Wireless Controller			1.50			

Normal - Basic install with no unforeseen obstructions or procedures.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

NURSE CALL

Installation Items		Labor Hours		
Additional Description	Normal	Difficult	Challenging	
Audio Visual (Non-Microprocessor)				
Master Station	3.85	5.26	6.33	
Central Equipment & Power Supply	6.41	7.53	9.94	
Patient Station	Single or Dual	1.36	1.69	2.23
Patient Station with Entertainment		1.49	2.25	2.68
Lavatory/Pull Station		1.05	1.26	1.81
Call Cord/Pillow Speaker		0.54	1.02	1.41
Staff Station		1.23	1.54	1.96
Duty Station		1.24	1.54	1.96
Dome Light		1.10	1.38	1.92
Zone Light		1.08	1.42	1.92
Corridor Light		1.10	1.39	1.96
Annunciator Panel	Remote	3.64	4.13	4.69
Psychiatric Station		1.42	1.74	2.34
Explosion Proof Station		1.56	1.96	2.55
Explosion Proof Switch		1.44	1.81	2.48
Power Supply		1.60	1.66	2.53
Audio Visual (Microprocessor)				
Master Annunciator	25 Room w/Backbox	5.62	6.34	7.44
Master Annunciator	50 Room w/Backbox	6.45	8.88	9.67
Master Annunciator	100 Room w/Backbox	13.01	13.85	14.25
Power Supply	With Backbox	2.23	2.44	3.29
Patient Station	Single or Dual	1.22	1.39	1.86
Lavatory/Bath Station		1.04	1.27	1.74
Dome Light		1.00	1.28	1.77
Power Supply	With Backbox	2.08	2.97	3.15
CPU/Central		6.51	7.35	8.19
Monitor and Keyboard		2.32	2.74	3.49
Printer		1.39	1.97	2.80
Patient Station	Single or Dual	1.26	1.47	1.56
Bed Station Call Cord		0.85	1.03	1.13
Lavatory/Bath Station		0.93	1.26	1.17
Staff Station		1.25	1.57	1.46
Duty Station		1.30	1.54	1.65
Dome Light		1.03	1.31	1.36
Zone Light		1.07	1.15	1.29
Pocket Paging/Computer Interface/Telephony		5.23	6.50	7.20

NURSE CALL CONTINUED

Installation Items	Additional Description	Labor Hours		
		Normal	Difficult	Challenging
Code Blue System				
Central Equipment		6.39	6.70	7.69
Nurse Station		3.76	5.82	6.75
Annunciator Panel		5.65	6.26	7.36
Call Station		1.10	1.82	2.58
Corridor Light		0.87	1.34	1.88
Zone Light		0.93	1.34	2.06
Power Supply		1.56	1.65	2.19
VOIP Nurse Call				
Nurse Call Server		8.15	N/A	N/A
Gateway		2.65	N/A	N/A
Switch		1.98	N/A	N/A
VOIP Patient Station		1.20	N/A	N/A
Graphical Workflow Station		3.89	N/A	N/A
Report Server		6.67	N/A	N/A
Messaging Server		4.15	N/A	N/A
Real Time Localization Server (RTLS)		5.02	N/A	N/A
ADT Integration		6.33	N/A	N/A

Normal - New construction with conduit and cabling support system already installed.

Difficult - New construction without conduit and cabling support system already installed or existing construction with conduit and cabling support system.

Challenging - Existing construction without conduit and cabling support system already installed.

Notes: Labor hours includes handling and unpacking of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

For healthcare facilities specifying CDC guidelines for dust containment and infectious control, add 35% to the challenging column figure.

SECURITY & ALARM SYSTEM

Installation Items	Additional Description	Programming	Labor Hours		
			Normal	Difficult	Challenging
Alarm System					
Infrared Motion Detector		N/A	0.87	1.12	1.64
Ultrasonic Motion Detector		N/A	0.80	1.12	1.68
Magnetic Door Switch	Surface	N/A	0.82	1.18	1.48
Magnetic Door Switch	Flush	N/A	0.97	1.38	1.78
Foil Tape	Per Foot	N/A	0.82	1.21	1.36
Tape Switch		N/A	0.84	1.25	1.78
Panic Button	Surface	N/A	1.03	1.06	1.41
Panic Button	Flush	N/A	0.79	1.14	1.62
Key Switch		N/A	0.76	1.09	1.57
Photo Electric Detector		N/A	0.91	1.09	1.48
Digital Key Pad		N/A	0.91	1.24	1.68
Electric Door Strike		N/A	1.41	1.60	2.07
Horn		N/A	0.77	1.11	1.59
Bell		N/A	0.75	1.10	1.59
Electronic Speaker/Siren		N/A	0.82	1.06	1.64
Glass Break Detector		N/A	0.77	1.08	1.38
Glass Break Detector	Wireless	N/A	0.68	0.94	1.26
Keypad	Wireless	N/A	0.75	1.04	1.58
Alarm Signal Device					
Bell		N/A	0.79	1.18	1.64
Indoor Horn/Siren		N/A	0.83	1.15	1.62
Indoor Strobe		N/A	0.82	1.10	1.36
Outdoor Horn/Siren		N/A	1.05	1.44	1.84
Back Box	Flush	N/A	0.68	1.02	1.35
Back Box	Surface	N/A	0.67	0.96	1.30
Control Panel		1.03	2.80	3.40	4.47
Expansion Module		1.10	1.40	1.68	1.98
Digital Communicator		0.89	1.54	1.86	2.41
Panel Programming Per Zone		0.66	0.86	1.26	1.74
Annunciators					
Basic Units/Modules	Installation	0.75	1.11	1.43	1.88
Installation and	Per Zone Module	N/A	0.77	1.18	1.69
Back Box		N/A	0.67	0.99	1.38
Control Panel					
Small	Residential/Commercial	1.80	2.20	2.48	2.67
Medium	Commercial	3.05	2.31	2.96	3.22
Large	Commercial	5.20	3.33	3.79	4.11
Separate Annunciator Panel		1.67	1.61	1.98	2.39
Remote Control Unit		1.38	1.38	1.84	2.44
Wireless Console	Residential	1.00	1.02	1.49	1.97
Wireless Panel	Residential	1.10	1.65	2.13	2.41
Wireless Panel	Commercial	2.50	2.27	2.42	2.91
Zone Expansion Module		1.07	1.32	1.73	2.17
Logic Module		1.23	0.96	1.34	1.82
AC Failure Module		0.75	0.83	1.18	1.68
Installation and	Per Zone Module	N/A	0.82	1.24	1.75
Back Box		N/A	0.75	1.10	1.50

Installation Items	Additional Description	Labor Hours			
		Programming	Normal	Difficult	Challenging
Peripherals					
Separate Digital Comm.		1.35	1.25	1.99	2.50
Cellular Phone Link		1.25	1.77	2.38	2.63
Telephone Control Module		1.05	1.14	1.61	2.08
Receiver	Single Channel	1.67	1.27	1.64	2.27
Receiver	2 Channel	1.78	1.30	1.69	2.33
Receiver	4 Channel	2.88	1.91	2.16	2.88
Receiver	8 Channel	5.05	2.56	3.14	3.88
Power Supply					
Battery		N/A	0.64	1.38	2.19
Battery Rack		N/A	0.74	1.28	1.95
Charger		N/A	0.86	1.21	1.82
Indicator Panel		1.00	1.05	1.59	2.25
Switch Over Control		1.10	1.05	1.41	2.15

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Examples: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Challenging - Examples: padded ceiling with multiple obstructions, requires a lift.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc.

Installation Items	Additional Description	Labor Hours					
		End-User Training	End-User Data Collection	In Shop Programming	On-Site Programming	Normal	Difficult
KSU							
Small (<12 Port)	With Standalone Voice Mail	3.25	2.42	2.53	3.91	3.65	4.60
Small (<12 Port)	With Integrated Voice Mail	2.85	2.42	2.20	3.00	2.40	4.12
Small (<12 Port)	Without Voice Mail	2.56	2.10	1.97	2.08	1.95	3.30
Medium (>12 Port)	With Standalone Voice Mail	4.80	3.81	3.75	4.92	3.75	5.20
Medium (>12 Port)	With Integrated Voice Mail	3.40	3.71	3.43	4.00	3.67	4.50
Medium (>12 Port)	Without Voice Mail	3.40	3.14	3.20	2.92	3.25	3.90
PBX							
Medium (12-128 Port)	With Standalone Voice Mail	8.20	5.21	6.93	2.05	1.74	3.60
Medium (12-128 Port)	With Integrated Voice Mail	8.00	5.08	6.10	1.71	1.75	2.97
Medium (12-128 Port)	Without Voice Mail	5.80	4.89	4.07	1.50	1.50	3.15
Large (>128 Port)	With Standalone Voice Mail	12.40	8.80	8.75	2.15	2.23	3.45
Large (>128 Port)	With Integrated Voice Mail	10.80	8.60	7.50	1.95	2.05	3.10
Large (>128 Port)	Without Voice Mail	8.40	8.20	5.50	1.97	1.87	3.03
Hybrid							
Small (<64 Port)	With Standalone Voice Mail	11.10	3.05	6.46	6.06	3.21	5.10
Small (<64 Port)	With Integrated Voice Mail	10.65	3.81	5.57	5.94	2.95	5.13
Small (<64 Port)	Without Voice Mail	7.40	3.54	3.19	4.75	2.11	3.90
Medium (64-128 Port)	With Standalone Voice Mail	12.10	5.91	7.91	8.44	3.41	6.30
Medium (64-128 Port)	With Integrated Voice Mail	10.95	5.88	7.21	8.25	3.35	6.17
Medium (64-128 Port)	Without Voice Mail	9.00	5.42	4.19	6.75	2.10	5.70
Large (>128 Port)	With Standalone Voice Mail	12.75	8.43	10.83	14.49	7.55	10.75
Large (>128 Port)	With Integrated Voice Mail	13.07	8.07	10.00	13.71	7.26	9.67
Large (>128 Port)	Without Voice Mail	11.00	7.36	7.17	10.71	6.12	9.33
Install Plywood	4 X 4	N/A	N/A	N/A	N/A	2.10	3.50
Install Enclosure		N/A	N/A	N/A	N/A	2.67	4.25
Install & Connect Power Supply		N/A	N/A	N/A	N/A	1.20	4.31
Install Battery Back-up Unit	Internal	N/A	N/A	N/A	N/A	1.15	2.20
Install Battery Back-up Unit	External	N/A	N/A	N/A	N/A	1.25	2.29
Install Admin Phone	Digital - Per Phone	N/A	N/A	N/A	N/A	0.89	1.17
Install Wall/Desk Phone	Digital - Per Phone	N/A	N/A	N/A	N/A	0.85	1.15
Install Admin Phone	Analog - Per Phone	N/A	N/A	N/A	N/A	1.05	1.30
Install Wall/Desk Phone	Analog - Per Phone	N/A	N/A	N/A	N/A	1.45	1.33
Install Busy Lamp Field	<64	N/A	N/A	N/A	N/A	1.19	1.55
Install Busy Lamp Field	64-128	N/A	N/A	N/A	N/A	1.48	1.56
Install Busy Lamp Field	>128	N/A	N/A	N/A	N/A	1.52	1.71
Punch Down/Label Block	<64	N/A	N/A	N/A	N/A	3.80	5.85
Punch Down/Label Block	64-128	N/A	N/A	N/A	N/A	4.56	8.10
Punch Down/Label Block	>128	N/A	N/A	N/A	N/A	7.85	9.75
VOIP System							
Communication Server/Gateway		N/A	4.10	2.40	N/A	2.15	3.10
Voicemail Server		N/A	2.60	2.40	N/A	2.03	2.75
Voice Switch		N/A	1.40	2.10	N/A	1.87	3.21
IP Phone		0.25	0.15	N/A	0.51	0.88	1.60
PC Software		2.00	2.40	N/A	3.10	1.15	N/A
PC Soft Phone		0.25	0.15	N/A	0.67	0.65	1.48
PC Operator Software		3.00	N/A	N/A	2.15	1.52	N/A

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Examples: installation in heights exceeding 10 feet, overcoming unforeseen obstructions and/or extensive programming, in facilities that require heightened security procedures.

Note: Labor hours includes handling and unpackaging of equipment, testing, along with time spent confirming drawings, diagrams, plans, etc. For wiring see Cabling on page 8.

VIDEO

Installation Items	Additional Description	Labor Hours		
		Programming*	Normal	Difficult
Projectors with mounts				
Projector - < 5000 lumen	Surface Mount - ceiling	0.39	2.75	6.13
Projector - < 5000 lumen	Suspended Ceiling	0.42	2.63	5.85
Projector - < 5000 lumen	Rear Screen	0.52	3.25	5.97
Projector - < 5000 lumen	Table or Cabinet - no mount	0.52	1.13	3.08
Projector - motorized** < 5000 lumen	Ceiling	0.49	4.75	7.52
Projector - motorized** < 5000 lumen	Table or Cabinet	0.44	3.88	5.50
Projectors with Heavy Duty Mounts				
Projector - > 5000 lumen	Surface Mount - ceiling	0.55	3.33	5.50
Projector - > 5000 lumen	Suspended Ceiling	0.47	3.67	6.23
Projector - > 5000 lumen	Rear Screen	0.47	4.11	4.67
Projector - > 5000 lumen	Table or Cabinet - no mount	0.49	1.07	2.10
Projector - motorized** > 5000 lumen	Ceiling	0.51	7.33	7.90
Projector - motorized** > 5000 lumen	Table or Cabinet	0.53	5.33	8.16
Screens				
Screen ≤ 100" -manual	Wall Mount	N/A	1.63	3.06
Screen ≤ 100" -manual	Ceiling Mount	N/A	1.75	2.89
Screen ≤ 100" -manual	Ceiling Mount - Recessed	N/A	3.00	4.35
Screen ≤ 100" - motorized**	Recessed Ceiling	N/A	4.75	7.00
Screen ≤ 100" - motorized**	Wall Mount	N/A	3.00	5.50
Screen ≤ 100" - motorized**	Ceiling Mount	N/A	3.25	6.15
Screen > 100" - manual	Wall Mount	N/A	2.38	5.00
Screen > 100" - manual	Ceiling Mount	N/A	2.50	4.96
Screen > 100" - manual	Ceiling Mount - Recessed	N/A	4.65	8.15
Screen > 100" - motorized**	Recessed Ceiling	N/A	6.75	9.85
Screen > 100" - motorized**	Wall Mount	N/A	4.50	7.12
Screen > 100" - motorized**	Ceiling Mount	N/A	4.87	8.00
Displays				
Display < 46"	Wall Mount - Stationary/tilt	0.44	2.00	2.85
Display < 46"	Wall Mount - Extending	0.45	2.50	3.12
Display < 46"	Pole Mount	0.44	2.38	3.87
Display < 46"	Ceiling Mount < 10'	0.50	2.25	3.40
Display < 46"	Ceiling Mount ≥ 10'	0.46	3.38	4.33
Display < 46"	Free Standing	0.51	1.63	2.48
Display < 46"	Motorized* - Table/Cabinet	0.51	3.13	4.67
Display < 46"	Motorized* - Ceiling Mount	0.50	3.75	5.39
Display > 46" - 2 installers***	Wall Mount - Stationary/tilt	0.47	2.33	3.15
Display > 46" - 2 installers***	Wall Mount - Extending	0.48	3.17	3.95
Display > 46" - 2 installers***	Pole Mount	0.52	2.50	4.05
Display > 46" - 2 installers***	Ceiling Mount < 10'	0.50	2.67	3.65
Display > 46" - 2 installers***	Ceiling Mount ≥ 10'	0.44	3.33	4.87
Display > 46" - 2 installers***	Free Standing	0.56	1.83	2.20
Display > 46" - 2 installers***	Motorized* - Table/Cabinet	0.51	3.50	5.37
Display > 46" - 2 installers***	Motorized* - Ceiling Mount	0.52	4.50	5.85
Interactive Whiteboard				
Interactive Whiteboard	Free Standing	1.65	2.25	3.50
Interactive Whiteboard	Wall Mount	1.49	2.97	4.50
Document Camera		0.88	1.75	3.35
Interactive Podium/Instructor Device		1.43	3.00	4.45
Miscellaneous				
Audience Response Systems	≤ 15 units	2.40	1.75	N/A
Audience Response Systems	16 to 30 units	3.80	1.75	N/A
Audience Response Systems	> 30 units	5.00	1.82	N/A

VIDEO CONTINUED

Installation Items	Additional Description	Labor Hours		
		Programming*	Normal	Difficult
Video Teleconferencing				
	<i>see Audio for speakers and mics</i>			
Camera/Webcam	Wall Mount	1.50	2.33	3.86
Camera/Webcam	Ceiling Mount	1.45	2.33	4.12
Camera/Webcam	In Wall Mount	1.48	3.33	4.79
Desktop Video Conference		1.50	1.67	2.15
Camera Control Console		2.50	4.00	7.25
Remote Control System for Camera Control		2.50	2.50	3.85
Image Controller		1.50	1.00	1.88
Call Server/Codec		1.50	1.98	2.11
Multipoint Conferencing Unit		2.50	3.15	4.00
Gateway Device		N/A	2.00	4.00
Echo Cancellation Mixer		N/A	2.00	3.95
Microphone Mixer/Switcher		1.55	2.67	5.20
Table top Speakerphone/Conference phone		1.00	1.83	3.66
Wireless Microphone System	4 or less	1.03	2.17	4.35
Wireless Microphone System	5 or more	1.50	3.17	6.05
Video Switching/Processing/Control				
16-32 inputs		2.25	2.40	4.60

*Programming on projectors and displays includes set up of basic functions and default settings.

**Motorized includes wiring for basic wall switch and remote control.

***Labor hours need to be multiplied by number of installers.

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Labor Installation Standard