LABOR INSTALLATION STANDARD

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Dear NSCA Member:

These updated guidelines have been prepared to assist you in calculating your project labor estimates. According to our research, labor variables have become the single biggest risk factor in determining the true cost of each of your projects. This document will help you benchmark your labor productivity and efficiency against fellow NSCA members, as well as successfully and accurately prepare estimates and bids.

This data was compiled through months of peer reviews and discussions among integrators across North America. Preliminary results were analyzed, averaged, and rounded. Those results were then further examined and compared to the latest industry best practices, prevailing code requirements, and job-costing reports.

Please read the disclaimer and usage guidelines to better understand how these guidelines should be used. The labor units listed should be adjusted based on the condition of each project.

NSCA thanks the member companies and individuals that contributed to this report. Their assistance makes this a highly valuable resource for the entire industry.

Sincerely,

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CEO
NSCA

Tom LeBlanc
Executive Director
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Ray Bailey
President
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WORK AND OPERATIONS COVERED BY LABOR UNITS

Material Handling

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

Drawings and Layouts

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

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 that all miscellaneous parts, tools, and equipment are at the jobsite, and that 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 spent on general project management or design modifications. The cost of supervision by a crew foreman or lead technician *is included* in labor units for all job sizes.

LABOR UNITS

Labor units are based on favorable working conditions, production rates, 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. Labor units under the *Very Difficult* column are for heights up to 16 feet. Other examples are noted within.

Adjustment of Labor Units

Labor units may be adjusted for the following reasons:

    a – Installer/technician productivity, experience, and training
    b – Non-productive labor issues (beyond normal site conditions)
    c – Job factors (security clearance, safety training, job-specific provisions, etc.)

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INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		PROGRAMMING	NORMAL	DIFFICULT
Controller				
CPU/Computer		4.05	2.06	2.65
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*	1.72	1.66	2.55
Layout Artwork	Photo Badging/Logo Cards	0.50	2.69	3.25
Print Badging/Cards on Local Printer	Per 10 Cards	1.50	0.97	1.64
Program Cards	Each	0.17	0.37	1.26
Upload System Data to Remote Panels		1.08	0.82	1.17
Client Work Station		0.50	2.17	3.05
Mobile Credential Interface	App on Client-Owned Device	0.25	0.25	1.00
NFC Reader	Wall Mounted	0.25	0.67	1.67
Visitor Management System	Centralized Control	4.00	3.00	6.33
Access Control Panel				
Control Panel	1 Reader	1.33	1.45	1.80
Control Panel	2 Reader	1.71	2.48	3.09
Control Panel	4 Reader	2.42	3.81	4.71
Control Panel	8 Reader	3.89	5.59	6.93
Control Panel	8 to 16 Reader	5.79	8.39	10.89
Card Reader	Standalone	1.56	2.01	3.32
Power Supply (12VDC)		0.25	1.51	2.36
Power Supply (24VDC)		0.25	1.51	2.36
Battery Back-Up		0.25	0.63	1.19
Elevator Interface-Relay Based	Driven by Control Panel	0.75	3.24	4.40
Input Control Board		2.00	1.65	3.31
Output Control Board		2.00	1.65	3.10
Door Access Devices				
Card Reader (prox, swipe, or touchpad)	Wall Mounted	0.44	1.13	2.00
Card Reader (prox, swipe, or touchpad)	Post Mounted	0.44	1.44	2.38
Reader/Door Controller		2.69	2.01	2.43
Palm/Fingerprint/Iris Biometric Reader		1.09	1.57	2.55
Door Contacts		0.25	0.78	1.37
Request-to-Exit Motion Detector		0.83	0.95	1.57
Telephone Door Entry Security		2.11	2.92	4.00
Remote Intercom Unit		0.25	1.32	2.27
Door Lock Devices				
Door Strike	Electric - New	0.25	2.52	3.76
Door Strike	Electric - Retrofit	0.25	1.62	2.05
Mortice Lock	Electric - New	0.25	2.80	3.95
Mortice Lock	Electric - Retrofit	0.17	1.74	2.15
Electric Hinge		0.25	1.95	2.39
Wi-Fi/Wireless Locks	Programming Includes Remote Server	0.25	2.00	4.00
Door Lock	Touchpad - New	0.25	1.55	1.88
Door Lock	Touchpad - Retrofit	N/A	2.52	3.17
Mag-Lock (Single Door)		0.50	3.01	4.99
Mag-Lock (Double Door)		0.50	5.32	7.65
Mag-Lock	Emergency Door, 15 Sec. Delay	0.25	4.35	7.01
RIM Lock		N/A	2.35	4.01
Push Bar Exit Device		0.25	2.71	4.33
Push Bar Exit Device	Electrified w/Power Supply	0.25	5.31	7.97
Miscellaneous				
Metal/Prohibited Item Detection Device	Standalone/Portable	2.00	1.25	1.50
Door Lock Protector		N/A	0.94	1.48
Key Switch		N/A	0.93	1.55
Door Closer		N/A	1.95	2.36
Outdoor or Vestibule Secure Key Box		N/A	1.25	2.00
NEMA Enclosure		N/A	1.20	1.65
Relay/Sockets		N/A	0.84	1.08
Motion Sensor		N/A	1.00	1.32
Bell/Horn		N/A	1.01	1.28
Emergency Door Release	Push Button	N/A	0.83	1.25
Surge Protector		N/A	0.42	1.00

*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 unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

For wiring, see Cabling on page 8.

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
Digital Signal Processor (DSP) with AEC		6.00	2.75	5.35	N/A
DSP I/O Interface		4.09	2.87	4.03	N/A
DSP Computer/Software		4.32	3.69	6.01	N/A
Mixing Console					
Mixing Console (1-8 inputs) - Analog	Rack/Desk Mounted	1.62	2.60	3.41	N/A
Mixing Console (8-16 inputs) - Analog	Rack/Desk Mounted	2.18	4.09	4.98	N/A
Mixing Console (8-16 inputs) - Digital	Rack/Desk Mounted	2.92	4.16	4.95	N/A
Mixing Console (17-32 inputs) - Analog	Desk Mounted	3.30	5.91	6.73	N/A
Mixing Console (17-32 inputs) - Digital	Desk Mounted	3.96	5.79	6.67	N/A
Mixing Console (32+ inputs) - Analog	Desk Mounted	4.84	7.17	8.83	N/A
Mixing Console (32+ inputs) - Digital	Desk Mounted	5.35	7.25	8.73	N/A
E-Control Add-On	WiFi Router, Connections, Programming, etc.	3.00	N/A	N/A	N/A
Audio Components					
Equalizer	Digital	1.59	1.70	2.04	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	1.88	2.10	N/A
Power Amplifier		1.03	1.31	1.75	N/A
Power Amplifier with built-in DSP		1.50	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
Ceiling Microphone		N/A	0.58	1.05	N/A
Wireless Microphone		0.13	0.21	1.02	N/A
Remote Antennas	Wireless Mic	N/A	0.64	3.33	N/A
Digital Snake		0.23	0.49	3.50	N/A
Beamforming Ceiling Microphone - 3 elements		1.00	0.75	1.00	
Beamforming Ceiling Microphone - 8 elements		4.00	1.00	1.50	

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION		STEP LADDER	EXT. LADDER	LIFT
Speakers					
Wall Speaker	Surface Mount	N/A	1.42	1.63	1.88
Wall Speaker	Flush Mount	N/A	1.60	1.82	2.10
Ceiling Speaker	Surface Mount	N/A	1.48	1.70	1.81
Ceiling Speaker	Flush Mount	N/A	1.38	1.58	1.88
Monitor Speaker		N/A	1.28	1.44	1.63
Speaker Clusters, Array, 2-3 Box	*WITHOUT BUILT-IN ATTACHMENT*				
Box Speaker	<40#	N/A	4.10	4.80	5.80
Box Speaker	>40#	N/A	4.35	5.13	5.86
L F Speaker/1 H F Horn		N/A	4.05	4.80	5.65
L F Speaker/2 H F Horn		N/A	4.65	5.28	6.70
L F Speaker/3 H F Horn		N/A	4.78	5.80	7.98
Speaker Clusters, Array, 2-3 Box	*WITH BUILT-IN ATTACHMENT*				
Box Speaker	<40#	N/A	3.01	3.50	4.35
Box Speaker	>40#	N/A	3.41	3.98	5.10
L F Speaker/1 H F Horn		N/A	3.67	4.50	5.42
L F Speaker/2 H F Horn		N/A	4.54	5.37	6.60
L F Speaker/3 H F Horn		N/A	4.88	5.85	7.26

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

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

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

Challenging - Examples: Padded ceiling with multiple obstructions, requirement of a lift.

Labor hours include handling and unpackaging of equipment, testing,and 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'	1.17	1.58	2.29
Single Cable 8-24 pair	per 100'	1.20	1.85	2.38
Single Cable 25 pair	per 100'	1.34	2.03	2.65
Single Cable 50 pair	per 100'	1.69	2.28	2.82
Single Cable 100 pair+	per 100'	1.89	2.76	3.54
Two to Four Cables 1-8 pair	per 100'	1.57	2.19	2.85
Five+ Cables 1-8 pair	per 100'	2.00	2.51	3.45
Single Cable Coax	per 100'	1.11	1.52	2.14
Two to Four Cables Coax	per 100'	1.44	1.87	2.49
Five+ Cables Coax	per 100'	1.76	2.31	2.89
Pre-Terminated Cable Installation				
HDMI/DVI/VGA	per 50'	0.55	1.37	2.03
Component/S-Video/Composite	per 50'	0.54	1.35	2.08

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	CABLE ONLY	EXISTING BOX	REQUIRES NEW BOX
Termination				
Category Cable Termination	Remote End	0.40	0.51	0.98
Category Cable Termination	Head End	0.52	0.50	1.00
25 Pair (per end)		1.63	2.03	2.36
Coax	"F" Style	0.27	0.29	0.62
Coax	BNC	0.35	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)	25 Pair	1.08	1.31	1.72
Install Patch Panel (RJ45)	24 Port	1.63	1.30	1.60
Testing				
Cat 5		0.46	0.22	0.33
Cat 6/6A		0.50	0.22	0.34
25-pair		0.96	0.38	0.47
Coax	Cable Analyzer	0.51	0.28	0.34

* 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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.
Cable installation hours do not include the removal of abandoned cable.

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

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	POLE MOUNT	ROOF MOUNT	INCLEMENT WEATHER
Antenna/Satellite Dish				
Antenna (off-air)		3.41	4.09	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	5.60	7.10
Satellite Dish	8' (LNB Included)	5.61	6.52	8.33

For display, see Video on pages 21-22.

Normal - Example: Connecting to a single monitor.

Difficult - Example: Distributing to multiple rooms/devices.

Challenging - Examples: Integrating multiple video sources; remodulating and distributing.

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

For wiring, see Cabling on page 8.

CATV Additional Notes

The NSCA Subject Matter Expert (SME) team acknowledges that the CATV category that once included MATV has evolved with the transition from analog to digital transmission. The use of encoding, RF modulation techniques, and streaming methods for HDMI and IPTV have become widely accepted. The data collected for labor units varied greatly due to the variety of configurations and was insufficient for compiling any meaningful data. As such we would like you to refer to the networking and digital signage sections for additional labor units for RF receivers and modulators; AV over IP switches; and HDTV distribution devices for e-sports stadiums, sports bars, hospitality, healthcare facilities, schools, luxury suites and other enterprise applications. HDMI and IPTV distribution methods will be a priority for the next LIS revision.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		NORMAL	DIFFICULT	CHALLENGING
Controller				
CPU/Computer		0.45	0.81	2.67
Software Load		0.49	1.30	2.42
Programming		2.08	4.03	6.00
Computer Hookup/Setup	For Use with CCTV Prog.	0.47	0.79	4.00
Install Software	DOS/Windows Based	0.52	1.88	4.00
Camera Programming	Each Camera	0.15	0.26	1.25
Viewing Station (passive - no control)		0.87	1.12	1.75
Mounting				
Power Bracket		1.02	1.44	1.86
Camera Control Unit		1.66	2.18	2.78
Mount	Standard	0.84	1.24	1.85
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	3.74	4.95	5.79
		STEP LADDER	EXT. LADDER	LIFT
Camera and Support Bracket				
Indoor Camera	Fixed	1.15	1.55	2.07
Indoor Camera	Pan/Tilt	1.68	2.17	2.72
Indoor Camera and Housing	Fixed	1.48	1.94	2.43
Indoor Camera and Housing	Pan/Tilt	1.89	2.50	3.15
Outdoor Camera and Housing	Fixed	2.25	2.79	3.30
Outdoor Camera and Housing	Pan/Tilt	2.68	4.48	4.04
Indoor Dome Camera	Fixed	1.50	2.06	2.63
Indoor Dome Camera	Pan/Tilt	1.83	2.44	3.05
Outdoor Dome Camera	Fixed	2.39	3.17	3.93
Outdoor Dome Camera	Pan/Tilt	3.05	3.75	4.61
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		1.14	1.67	2.06
Outdoor Mini Dome Camera		2.09	2.79	3.25
Multisensor Camera		2.00	2.50	3.00
Monitor				
Monitor Bracket	Wall	1.22	1.82	2.42
Monitor Bracket	Ceiling	1.85	2.44	3.44
Monitor in Rack	Install	1.02	1.47	1.98
Monitor in Rack	Fabricate	1.99	2.95	3.78
Accessories				
Digital Video Recorder - DVR	Desktop	0.79	1.23	1.70
Digital Video Recorder - DVR	Rack Mount	1.06	1.54	2.08
Network Video Recorder - NVR		1.00	1.63	2.21
Server Build Up		1.33	2.04	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	2.45
Remote Control Box (Pan/Tilt/Zoom/Focus)	Rack Mount	1.76	2.12	2.59
Remote Power Supply		1.07	1.61	1.93
Switcher	Desktop	1.56	1.93	2.49
Switcher and Mounting Bracket	Rack Mount	1.96	2.49	3.01
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	2.97
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	2.12	2.60
Alarm Interface		1.77	2.17	2.70
Programming	Per Channel	0.54	1.06	1.33
IP Encoder		0.53	2.00	4.00
Camera Lenses				
Fixed		0.53	0.65	0.99
Auto Iris		0.65	0.90	1.37
Zoom		0.87	1.03	1.26
Add or Replace Lens		0.75	1.22	1.81

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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

For wiring, see Cabling on page 8.

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	1.23
Secondary Clock and Speaker	with Wire Guard	0.90	1.43
Secondary Clock and/or Speaker	Digital	1.60	1.95
with Backbox		1.59	2.01
Secondary Clock and/or Speaker	Analog	1.04	1.38
with Backbox		0.99	1.20
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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS	
		NORMAL	DIFFICULT
Content Server			
Install & Configuration	Furnished by Others (IT)	5.68	7.03
Content Design Services and Programming	Basic	7.98	9.62
RSS Feed Capability	Connectivity Only	1.10	1.65
Streaming Video	Connectivity Only	1.05	1.74
Database Integration	Furnished by Others (IT)	4.91	6.77
Wayfinding	Implementation per location	3.10*	4.17*
User Training	Remote Training for Basic and Advanced Settings	4.00	6.00
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)	1.67	2.16
Update Media Player Software		1.51	2.56
Add Coaxial TV Input		1.38	2.19
Multiple Display Output		2.66	3.20
Display Scheduling and Control		0.81	1.50
Interactive Display		0.81	1.50
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 pages 21-22.

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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS	
		NORMAL	DIFFICULT
Equipment Racks & Cabinets			
Field Installation	Floor Mount 42"-77"	2.82	3.74
Staging/Pre-Assembly/Cable Dress	Floor Mount 42"-77"	3.20	3.60
Blank Panels	Each	0.30	0.58
Ventilation Panel /Fan	Each	0.58	0.84
Power Strip	Each	0.71	0.97
AC Power Panel/Sequencer	non-UPS	0.93	1.26
Wall Equipment Cabinet	28" or Less	2.04	3.07
Wall Equipment Cabinet	Over 28"	2.66	3.78
UPS Unit	rack mounted w/ battery	1.66	3.00
Wall Plates & Floor Boxes			
Audio	≤ 2 connections per gang	0.65	1.41
Audio	> 2 connections per gang	1.26	1.53
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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

Note: Preassembly has been added assuming that this will be done prior to rack being shipped to jobsite.

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'	1.70	2.64	4.04
Inner-Duct Placement		STEP LADDER	EXT. LADDER	LIFT
Inner-Duct	per 100'	2.66	3.18	3.93
Termination Multimode		NORMAL	DIFFICULT	CHALLENGING
Breakout Kit 6 Strand	Per End	1.20	2.90	3.52
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

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		NORMAL	DIFFICULT	CHALLENGING
Termination Singlemode				
Breakout Kit 6-Strand	Per End	1.34	3.10	3.77
Breakout Kit 12-Strand	Per End	1.96	3.24	4.41
Breakout Kit 24-Strand	Per End	2.96	3.63	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	4.75
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	4.92
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
		TESTING AVERAGE	DOCUMENTATION AVG.	
Testing				
Singlemode One Direction Per Strand	OTDR	0.44	0.63	N/A
Multimode One Direction Per Strand	OTDR	0.44	0.63	N/A
Singlemode One Direction Per Strand	Power Meter	0.50	0.51	N/A
Multimode One Direction Per Strand	Power Meter	0.50	0.51	N/A
Singlemode Splice Loss	OTDR	0.54	0.63	N/A
Multimode Splice Loss	OTDR	0.69	0.97	N/A

Normal - Example: Suspended ceiling.

Difficult - Examples: No conduit/raceway provided, above normal ceiling height.

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

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

FIRE ALARM & SAFETY

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS			
		PROGRAMMING	NORMAL	DIFFICULT	CHALLENGING
Controllers					
4 Zone		1.36	1.91	2.56	3.34
8 Zone		1.74	2.69	3.48	4.59
12 Zone		2.56	3.77	4.94	6.43
24 Zone		3.75	5.52	6.77	8.63
48 Zone		6.22	8.25	9.78	11.87
Addressable Controller		3.16	4.86	6.15	8.05
Battery, with Rack		N/A	1.43	1.91	2.61
Battery Charger		N/A	1.37	1.61	2.14
Relay		1.39	0.91	1.10	1.45
Test Switch		1.00	0.92	1.10	1.44
Remote Annunciator		1.30	0.99	1.44	1.98
Fireman's Phone		1.25	1.21	1.48	1.94
Digital Communicator		1.74	1.87	2.85	3.91
Remote Interface		2.20	1.67	1.90	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	5.35
Addressable Annunciators		1.98	2.13	2.50	3.11

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS			
		PROGRAMMING	NORMAL STEP LADDER	DIFFICULT EXT. LADDER	CHALLENGING LIFT
Detection Devices					
Heat Detector	Hours Conventional	0.25	0.74	0.90	1.29
Heat Detector	Hours Addressable	0.40	0.71	0.93	1.26
Smoke Detector	Hours Conventional	N/A	0.77	0.99	1.35
Smoke Detector	Hours Addressable	0.40	0.73	0.98	1.34
Duct Smoke Detector	Hours Conventional	N/A	1.61	1.97	2.35
Duct Smoke Detector	Hours Addressable	0.50	1.63	1.96	2.51
Manual Pull Station	Hours Conventional	N/A	0.76	1.36	1.64
Manual Pull Station	Hours Addressable	0.40	0.73	1.36	1.66
Explosion-Proof Pull Station		N/A	1.23	1.88	2.35
Remote Test Station		N/A	0.79	1.06	1.39
Remote LED Detector		N/A	0.70	0.91	1.22
Signaling Devices					
Horn		N/A	1.01	1.20	1.50
Weatherproof Horn		N/A	1.27	1.45	1.65
Amplified Horn		N/A	1.08	1.35	1.88
Horn/Strobe		N/A	1.21	1.47	1.82
Bell		N/A	1.03	1.23	1.53
Weatherproof Bell		N/A	1.20	1.38	1.68
Audio/Visual		N/A	1.03	1.24	1.54
Strobe Light		N/A	1.05	1.24	1.55
Explosion Proof Strobe Light		N/A	1.66	1.86	2.05
Rotating Beacon		N/A	1.48	1.82	2.10
Speaker 8 Inch	Ceiling	N/A	1.07	1.50	1.91
Speaker 4 Inch	Wall	N/A	0.99	1.36	1.63
Speaker/Strobe		N/A	1.15	1.36	1.66
Miscellaneous					
Magnetic Door Release		N/A	1.26	1.68	2.09
PC Configuration					
Printers		N/A	1.58	1.94	2.46
Keyboard and Monitor		N/A	1.61	1.90	2.40
Graphics PC		N/A	0.32	N/A	N/A
Software		2.00	1.00	2.00	4.00
Control Panel Modules					
Control Relay Module		N/A	0.94	1.14	1.37
4 Circuit Signal Module		N/A	1.10	1.31	1.78
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 Firefighter's Telephone		N/A	1.64	2.01	2.79
30 to 80 Watt Amplifier		N/A	1.46	1.80	2.25
80 to 250 Watt Amplifier		N/A	1.87	2.25	2.70
Audio Message Generator		N/A	1.92	2.04	2.38
Fire Alarm Devices					
Guard for Stations		N/A	0.72	0.92	1.25
Pressure Switch - No Plumbing		N/A	1.11	1.36	1.65
Firefighter's Phone		N/A	1.09	1.32	1.63
Firefighter's Phone Jack		N/A	0.94	1.11	1.41
4PSDT Relay/Surface-Mount Enclosure		N/A	0.95	1.19	1.48
Magnetic Door Release		N/A	1.19	1.41	1.77
Flow Switch - No Plumbing		N/A	1.20	1.43	1.76
Tamper Switch		N/A	1.14	1.35	1.67
Adapter Plate		N/A	0.52	0.73	0.95
Trim Plate		N/A	0.50	0.70	0.95
Addressable Device (Remote)		0.75	0.97	1.15	1.40
Keyboard and Monitor		N/A	1.90	2.20	2.62

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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		NORMAL	DIFFICULT	CHALLENGING
Intercom - Master Station				
Master Assembly	Desktop	2.61	3.50	4.14
Master Assembly	Rack	3.17	3.98	4.69
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
IP Call Tower	Outdoor Emergency Device	TBD	TBD	TBD
Amplifiers/Mixers				
Package Amp/Mixer	Shelf Mounted	1.53	1.85	2.50
Package Amp/Mixer	Rack Mounted	1.50	1.82	2.35
Modular Package Amp/Mixer	Shelf Mounted	1.91	2.20	2.89
Modular Package Amp/Mixer	Rack Mounted	1.91	2.13	2.64
Module - Insert & Connect		0.65	0.99	1.29
Power Amplifier	Rack Mounted	1.15	1.40	1.75
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
Output from Emergency Signaling Equipment		1.00	1.50	2.00
Signal Processor				
Equalizer	Install/Connect	1.32	1.93	2.68
Equalizer	Setup Equalization	1.92	2.28	2.96
Compressor/Limiter	Install/Setup	1.19	1.59	2.14
Ambient Sensing	Auto Level Set	1.88	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		1.13	1.57	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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		PROGRAMMING	NORMAL	DIFFICULT
IoT and IP Endpoints				
	PoE	Edge Device Only		
	Surface Mount - Ceiling	0.39	2.88	6.13
Remote Monitoring Agents	Network	0.50	0.25	0.50
Gun Shot Detection Device		0.25	1.00	2.00
Vaping Detection Device		0.25	1.00	2.00
Sensor Technologies				
		Edge Device Only		
Thermal Sensor	Free Standing/Kiosk	0.45	2.39	4.50
Thermal Sensor	Ceiling Fixed Install	0.25	1.00	2.00
Auxiliary Display	Desk Mounted		1.00	2.00
Mask Detection Device	Ceiling Fixed Install	0.45	1.00	2.00
Air Quality Sensor Device	Ceiling Fixed Install	0.45	1.67	3.33
PoE LED Lighting				
Light Fixture/Luminaire	Wall Mount	NA	1.63	3.06
Wireless Self-Powered Wall Switch	Wall Mount	0.50	0.25	0.50
Wall Controller/Dimmer	Wall Mount	N/A	1.00	2.50
Occupancy/Daylight Sensor	Ceiling Mount			
PoE Switch	Up to 16 ports			
PoE Injector		N/A	0.50	NA
DAS & BDA				
		N/A	1.50	3.00
Controller		1.00	2.00	4.00
Remote Devices		N/A	0.50	1.00
Testing and Commissioning		N/A	6.00	12.00

Site assessment not included in DAS and BDA systems. Cabling is located in other sections.

Normal - Basic install with no unforeseen obstructions or procedures.

Difficult - Example: 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 unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS			
		ETHERNET	GIGABIT	INTEGRATOR PROVIDED	IT DEPT. FURNISHED
Hubs					
Non-Stackable		0.39	0.46	N/A	N/A
Non-Stackable w/ Built-In Management		0.47	0.49	N/A	N/A
Non Stackable w/ Add-In Management Module		0.65	0.55	N/A	N/A
Stackable		0.48	0.49	N/A	N/A
Stackable w/ Built-In Management		0.57	0.52	N/A	N/A
Stackable w/ Add-In Management Module		0.75	0.58	N/A	N/A
Up Link Modules		0.37	0.42	N/A	N/A
Switches					
Non-Stackable		1.00	1.55	N/A	N/A
Non-Stackable w/ Built-In Management		1.22	1.80	N/A	N/A
Non Stackable w/ Add-In Management Module		1.48	1.89	N/A	N/A
Stackable		1.23	1.90	N/A	N/A
Stackable w/ Built-In Management		1.32	1.80	N/A	N/A
Stackable w/ Add-In Management Module		1.58	2.45	N/A	N/A
Up Link Modules		0.49	0.45	N/A	N/A
Enterprise Chassis		1.82	1.83	N/A	N/A
Switch Fabric		2.20	2.10	N/A	N/A
Interface Module		0.39	0.65	N/A	N/A
Layer 3 Switching/Routing		3.15	3.20	6.00	3.00
Trunking, STP, Redundant Links		2.88	2.65	4.00	2.00
VLAN Implementation		2.55	2.40	8.00	4.00

INSTALLATION ITEMS	LABOR HOURS					
	CHASSIS	FRAME	ETHERNET	GIGABIT	INTEGRATOR PROVIDED	IT DEPT. FURNISHED
Routers						
Boundary Router	1.12	1.00	2.79	3.33	N/A	N/A
Assignment of IP Addresses					1.00	0.50
Mid-Tier Router	1.00	1.10	3.30	3.50	N/A	N/A
Layer 3 Switching/Routing	0.88	0.92	3.80	4.44	6.00	3.00
VLAN Implementation/Routing/Subnet	0.74	0.95	3.75	4.04	8.00	4.00
Enterprise Router	1.50	0.86	6.05	5.87	N/A	N/A
Interface Card	0.75	1.05	1.20	1.20	N/A	N/A
Layer 3 Switching/Routing	0.88	1.00	3.79	4.00	6.00	3.00
VLAN Implementation/Routing/Subnet	1.10	0.89	6.00	6.05	8.00	4.00

INSTALLATION ITEMS	SOFTWARE				INTEGRATOR PROVIDED	IT DEPT. FURNISHED
Network Management						
Operating System (Built-In)	2.50				2.00	N/A
Windows Based	4.35				2.00	N/A
Proprietary Operating System	3.87				2.00	N/A
Client-Developed Solution					TBD	TBD

INSTALLATION ITEMS			ETHERNET		INTEGRATOR PROVIDED	IT DEPT. FURNISHED
Wireless Network						
Access Points/SSID Config			1.10		2.00	0.50
Wireless Controller			1.50		1.00	0.50

Normal - Basic install with no unforeseen obstructions or procedures. Network devices will be placed in a controlled environment with easy access.

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

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		NORMAL	DIFFICULT	CHALLENGING
Audiovisual (Non-Microprocessor)				
Master Station		4.00	5.52	6.46
Central Equipment & Power Supply		6.67	8.16	9.98
Patient Station	Single or Dual	1.41	1.78	2.23
Patient Station with Entertainment		1.55	2.36	2.75
Lavatory/Pull Station		1.09	1.32	1.81
Call Cord/Pillow Speaker		0.56	1.07	1.41
Staff Station		1.28	1.61	1.96
Duty Station		1.29	1.61	1.96
Dome Light		1.14	1.45	1.92
Zone Light		1.13	1.49	1.92
Corridor Light		1.14	1.46	1.96
Annunciator Panel	Remote	3.79	4.34	5.19
Psychiatric Station		1.52	1.83	2.51
Explosion-Proof Station		1.62	2.06	2.55
Explosion-Proof Switch		1.50	1.90	2.48
Power Supply		1.67	1.92	2.53
Tone Visual Only (Non-Microprocessor)				
Master Annunciator	25 Room w/Backbox	5.84	6.77	7.74
Master Annunciator	50 Room w/Backbox	6.48	8.86	9.92
Master Annunciator	100 Room w/Backbox	13.53	15.81	18.07
Power Supply	with Backbox	2.32	2.75	3.39
Patient Station	Single or Dual	1.27	1.56	1.86
Lavatory/Bath Station		1.08	1.33	1.74
Dome Light		1.04	1.34	1.77
Audiovisual (Microprocessor)				
Power Supply	with Backbox	2.17	3.12	3.43
CPU/Central		6.77	8.14	9.19
Monitor and Keyboard		2.41	2.96	3.49
Printer		1.44	2.07	2.80
Patient Station	Single or Dual	1.31	1.62	1.67
Bed Station Call Cord		0.89	1.08	1.32
Lavatory/Bath Station		0.97	1.32	1.51
Staff Station		1.30	1.65	1.89
Duty Station		1.35	1.77	2.03
Dome Light		1.07	1.34	1.50
Zone Light		1.11	1.31	1.40
Pocket Paging/Computer Interface/Telephony		5.44	6.83	7.78
Code Blue System				
Central Equipment		6.65	7.72	7.69
Nurses' Station		3.91	6.11	7.02
Annunciator Panel		5.87	7.04	8.09
Call Station		1.14	1.92	2.58
Corridor Light		0.91	1.41	1.88
Zone Light		0.97	1.41	2.06
Power Supply		1.62	1.89	2.31
VoIP Nurse Call				
Nurse Call Server		8.48	N/A	N/A
Gateway		2.76	N/A	N/A
Switch		2.06	N/A	N/A
VoIP Patient Station		1.25	1.51	1.73
Graphical Workflow Station		4.05	4.90	5.60
Report Server		6.94	N/A	N/A
Messaging Server		4.32	N/A	N/A
RTLS				
Real Time Localization Server (RTLS)		3.35	N/A	N/A
Asset Tracking Remote Devices		0.17	0.33	1.00
ADT Integration		4.22	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.

Note: Labor hours include handling and unpackaging of equipment, testing, and 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.

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS			
		PROGRAMMING	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	1.44
Tape Switch		N/A	0.84	1.25	1.78
Panic Button	Surface	N/A	1.03	1.18	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	1.69	2.14
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
Wired Devices		0.25	0.50	0.75	1.25
Wireless Devices		0.25	0.25	0.50	1.00
Alarm Signal Device					
Bell		N/A	0.43	0.98	1.38
Indoor Horn/Siren		N/A	0.44	0.97	1.21
Indoor Strobe		N/A	0.44	0.95	1.12
Outdoor Horn/Siren		N/A	0.68	1.31	1.95
Backbox	Flush	N/A	0.68	1.01	0.92
Backbox	Surface	N/A	0.67	0.98	0.90
Control Panel		1.03	1.27	2.32	3.49
Expansion Module		0.82	0.55	1.07	1.28
Digital Communicator		0.68	0.60	1.13	1.39
Panel Programming per Zone		0.66	0.43	1.13	1.37
Annunciators					
Basic Units/Modules	Installation	0.75	0.55	1.22	1.44
Installation	Per Zone Module	N/A	0.77	1.09	0.97
Backbox		N/A	0.67	0.99	0.94
Control Panel					
Small	Residential/Commercial	1.80	1.07	1.87	3.38
Medium	Commercial	3.05	1.10	1.99	3.49
Large	Commercial	5.20	1.44	2.33	5.26
Separate Annunciator Panel		1.67	1.07	1.65	2.63
Remote Control Unit		1.38	0.92	1.56	1.96
Wireless Console	Residential	1.00	0.68	1.33	1.65
Wireless Panel	Residential	1.10	1.10	1.75	3.01
Wireless Panel	Commercial	2.50	1.51	2.09	4.15
Zone Expansion Module		1.07	0.88	1.48	1.78
Logic Module		1.23	0.64	1.23	1.55
AC Failure Module		0.75	0.56	1.12	1.45
Installation	Per Zone Module	N/A	0.82	1.16	1.33
Backbox		N/A	0.75	1.07	1.17
Peripherals					
Separate Digital Comm.		0.98	0.67	1.41	2.17
Cellular Phone Link		1.25	1.18	1.92	3.20
Telephone Control Module		1.05	0.76	1.41	2.05
Receiver	Single Channel	1.67	0.85	1.42	1.84
Receiver	2 Channel	1.78	0.87	1.46	1.88
Receiver	4 Channel	2.88	1.27	1.85	2.45
Receiver	8 Channel	5.05	1.71	2.42	3.63
Power Supply					
Battery		N/A	0.64	1.25	1.63
Battery Rack		N/A	0.74	1.18	1.47
Charger		N/A	0.86	1.14	1.38
Indicator Panel		1.00	0.70	1.40	1.83
Switch Over Control		1.10	0.70	1.28	1.77

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 include handling and unpackaging of equipment, testing, and time spent confirming drawings, diagrams, plans, etc.

TELEPHONY

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	1.82
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
Voice Mail 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

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For wiring, see Cabling on page 8.

VIDEO DISPLAY & PRESENTATION

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		PROGRAMMING˙	NORMAL	DIFFICULT
Projectors with Mounts				
Projector - < 5000 lumen	Surface Mount - Ceiling	0.57	2.88	5.85
Projector - < 5000 lumen	Suspended Ceiling	0.59	2.96	5.85
Projector - < 5000 lumen	Rear Screen	0.64	3.63	5.97
Projector - < 5000 lumen	Table or Cabinet - No Mount	0.64	0.97	2.81
Projector - motorized** < 5000 lumen	Ceiling	0.67	4.75	8.26
Projector - motorized** < 5000 lumen	Table or Cabinet	0.65	3.88	5.50
Projectors with Heavy-Duty Mounts				
Projector - > 5000 lumen	Surface Mount - Ceiling	0.65	3.33	5.50
Projector - > 5000 lumen	Suspended Ceiling	0.61	3.71	6.23
Projector - > 5000 lumen	Rear Screen	0.62	4.11	4.91
Projector - > 5000 lumen	Table or Cabinet - No Mount	0.62	1.07	2.10
Projector - motorized** > 5000 lumen	Ceiling	0.68	7.67	9.59
Projector - motorized** > 5000 lumen	Table or Cabinet	0.69	5.33	8.16
Screens (only)				
Screen ≤ 100" - manual	Wall Mount	N/A	2.22	3.80
Screen ≤ 100" - manual	Ceiling Mount	N/A	2.56	4.13
Screen ≤ 100" - manual	Ceiling Mount - Recessed	N/A	3.75	5.35
Screen ≤ 100" - motorized¨	Recessed Ceiling	N/A	5.56	8.25
Screen ≤ 100" - motorized¨	Wall Mount	N/A	4.50	7.38
Screen ≤ 100" - motorized¨	Ceiling Mount	N/A	5.00	8.11
Screen > 100" - manual	Wall Mount	N/A	2.83	5.25
Screen > 100" - manual	Ceiling Mount	N/A	3.22	5.47
Screen > 100" - manual	Ceiling Mount - Recessed	N/A	5.21	7.86
Screen > 100" - motorized¨	Recessed Ceiling	N/A	7.06	10.39
Screen > 100" - motorized¨	Wall Mount	N/A	5.63	8.59
Screen > 100" - motorized¨	Ceiling Mount	N/A	6.30	9.50
Visual Displays				
Display < 46"	Wall Mount - Stationary/Tilt	0.46	2.00	2.85
Display < 46"	Wall Mount - Extending	0.46	2.50	3.12
Display < 46"	Pole Mount	0.46	2.38	3.87
Display < 46"	Ceiling Mount < 10'	0.50	2.25	3.40
Display < 46"	Ceiling Mount ≥ 10'	0.47	3.38	4.33
Display < 46"	Freestanding	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	0.48	2.33	3.15
Display > 46" - 2 installers***	Wall Mount - Extending	0.49	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'	0.46	3.38	4.90
Display > 46" - 2 installers***	Freestanding	0.55	1.83	2.25
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
Furniture Mounted	Huddle Space Kit	N/A	2.00	3.00

INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		PROGRAMMING*	NORMAL	DIFFICULT
Interactive Whiteboard				
Interactive Whiteboard	Freestanding	1.65	2.25	3.50
Interactive Whiteboard	Wall Mount	1.49	2.97	4.50
Document Camera		0.79	1.69	3.26
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
Direct View LED Wall				
Below 70 sq ft - 2 installers***	Wall Mount	4.00	13.00	19.00
70 sq. ft. to 164" - 3 installers***	Wall Mount	4.00	17.00	24.00
Above 164" - 3 installers***		4.00	20.00	32.00
Indoor Direct View LED Video Wall		N/A	16.00	24.00
Outdoor Direct View LED Video Wall		0.00	24.00	36.00
Commissioning/Testing		8.00	N/A	N/A

*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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INSTALLATION ITEMS	ADDITIONAL DESCRIPTION	LABOR HOURS		
		PROGRAMMING*	NORMAL	DIFFICULT
Videoconferencing/Unified Communications				
Camera/Webcam	Wall Mount	1.50	2.33	3.86
Camera/Webcam	Ceiling Mount	1.45	2.54	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	2.30
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
Tabletop 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				
Less than 8 Inputs		0.10	1.00	3.00
8-16 Inputs		1.50	1.50	3.50
16-32 Inputs		2.50	2.40	4.60
32-64 Inputs		3.00	4.00	7.00
Greater than 64 Inputs		4.50	8.00	12.00
Network Video Endpoint		0.50	1.00	2.33
Video Extender Set		0.25	1.00	1.50
AV Control Section				
Control Processor		6.00	1.50	2.50
Control Touch Panels - 10" and Under		8.00	0.75	1.50
Control Touch Panels - Above 10"		11.50	1.00	2.00
Occupancy Sensor		1.00	0.75	1.00
Divide Combine Logic Programming		16.00	N/A	1.00
Lighting Control Programming		6.00	0.50	1.00
Shade Control Programming		4.00	0.50	1.00
HVAC Control Programming - BACnet		8.00	N/A	1.00
Room Scheduling Panels		1.00	1.00	1.50

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

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

LABOR INSTALLATION STANDARD