

LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY  
- LIGO -  
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<b>LIGO Cable Numbering and Marking Standard</b>			
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LIGO DRAFT

# 1 INTRODUCTION

## 1.1. Purpose

The purpose of this document is to define the cable numbering and marking standards that will be used for identification of cables in LIGO.

## 1.2. Scope

This standard covers all cables that are used by LIGO CDS systems. Cables that are not covered by this standard are:

- Facility cables- AC power feeds installed as part of the facility construction.
- Facility communications cables- Copper and fiber communications cabling installed as part of the facility construction.
- Vacuum equipment cables- Vacuum equipment cables installed by the vacuum equipment contractor as part of the vacuum control and monitoring system. Cabling installed by the LIGO CDS group for the purposes of vacuum equipment control and monitoring are covered by this standard.

## 1.3. Definitions

### 1.3.1. Cable

A cable is defined as a continuous length of conductors from connector (termination) to connector (termination). Cables runs that have in line connectors or terminations shall be designated as multiple cables and the in line connections documented on the applicable schematics.

### 1.3.2. Cable Jacket and Conductor Insulation

Cable jacket is defined as the outer covering that encloses all of the conductors of a particular cable. Conductor insulation is defined as the covering (insulation) for individual conductors of a cable or single pieces of wire.

### 1.3.3. Cross Connect

Any device that is used to terminate or allow connection to individual conductors of a cable. Cross connects are different from connectors in that one conductor of a cable may be connected to multiple other points via cross connects. Examples include:

- terminal strips
- Phoenix or Wago strips and blocks

### **1.3.4. Connector**

Any device that is used to terminate or allow connection to individual conductors of a cable. Connectors are different from cross connects in that one conductor of a cable is connected to only one point (i.e. pin or socket) of the connector. Examples include:

- Coaxial connectors- BNC, LEMO, SMA
- Multi-conductor connectors- DB9, DB25, DIN96, MS style
- Telephone/communications connectors- RJ-11, RJ-45

## **1.4. Acronyms**

- CDS- Control and Data System

## **1.5. Applicable Documents**

### **1.5.1. LIGO Documents**

### **1.5.2. Non-LIGO Documents**

## **2 STANDARDS**

### **2.1. Cable Numbering**

Cable shall be numbered sequentially. Numbers shall be issued from a common database to prevent duplication. The cable numbering database shall include the following minimum information for each cable:

- Cable type
- Number of conductors
- Signal type (i.e. high voltage, DC, AC power, signal, etc.)
- Termination type each end(i.e. BNC, LEMO, DB9, cross connect, etc.)
- System to which cable belongs
- Applicable schematic numbers
- To/From information
- Cable length
- Cable routing

### **2.2. Cable Labelling**

All cables shall be labelled with the following minimum information on each end of the cable:

- Cable number
- To/From information
- The system to which the cable belongs

## 2.3. Wire and Cable Coloring

### 2.3.1. Cable Jacket Coloring

The table below shows the cable jacket colors that are reserved. Cable types that are not listed may use any color jacket, preferably gray or black, but shall not use any of the reserved colors.

**Table 1: Cable Jacket Color Coding**

<i>Cable Type</i>	<i>Cable Jacket Color</i>
High Voltage	Red
Category 5 Network Cables	Blue
Fiber Optic (non-trunk runs)	Orange

### 2.3.2. Cable Conductor Color Coding

Multi-conductor cables shall use the color coding specified by the manufacturer of the cable when the conductors are being terminated to connectors or cross connects. In addition, the colors of the individual conductors/connections shall be shown on the applicable schematics.

### 2.3.3. Internal Chassis and Rack Wiring Color Coding

Internal chassis and rack wiring shall use the following color coding.

**Table 2: Chassis and Rack Wiring Color Coding**

<i>Signal Type</i>	<i>Wire Insulation Color</i>
Positive DC Power Supply (i.e. +24, +15, +12, +5 volts)	Red
Negative DC Power Supply (i.e. -24, -15, -12, -5 volts)	Blue
DC Power Supply Return	Brown
115 VAC Hot	Black
115 VAC Neutral	White
Earth/Rack Ground	Green
Cross Connect "Bugger"	Orange

## **2.4. Cable Marking**

All cables containing a shield shall be marked by a blue band on the end or ends of the cable where the shield is terminated. Shield termination shall also be documented on the applicable schematics. Absence of the blue band shall indicate a floating shield on the respective end of the cable.