10641 Highway 36
Covington, GA
30014

www.sunbeltbuilders.com

t 770.786.3031
f 770.786.3046

Newton County – R.L. Cousins Center

TechOptics, Inc.
463 Bankhead Hwy.
Winder, GA 30680
ph: 770-867-1777
Chad Maynard
chad@techoptics.net

27-2000 Low Voltage, Access & Video O&M

TechOptics
voice.data.video.security

NEWTON COUNTY, GA –R.L. COUSINS COMMUNITY CENTER

OPERATIONS & MAINTENANCE MANUAL – STRUCTURED DATA CABLING SYSTEM

Version 1.0

Date 01/16/2026

VERSION HISTORY

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason
1.0	*Luke Martin*	*01/16/2026*	*Chad Maynard*	*01/16/2026*	*Original release*

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PURPOSE

The overall purpose of the Voice / Data distribution cabling system is to provide a STRUCTURED CABLING SYSTEM for connecting each of the Telephone, Data, WiFi, and other outlets to the respective operating systems. The structured cabling system is designed to provide the flexibility to change the telephone outlets to data outlets and vice versa, by suitable changes in the wiring closets. The structured cabling system interconnects telecommunication equipment (for Data, Voice or CATV) in a multi – vendor environment and is based on modular sub-systems that are independent yet complimentary. This approach facilitates easy growth, since changes in one sub-system do not affect others. The system uses hierarchy of nodes laid out in a star topology, thus facilitating moves, changes and additions without having had to again lay the cables.

1.2 AUDIENCE

This document is designed for use by the facility owner and their staff such as network administrators, systems administrators, and other technology staff to aid in the operations of the installed systems.

2 SYSTEM DESCRIPTION

In all the areas covered under this package, the voice, data, IP paging, WiFi, and camera outlets are installed with RJ-45 sockets, into which the client will be able to plug in the cables (line cords) connecting to Computers, Wireless Access Point, IP Paging devices, Cameras, etc with suitable cross-connections at the patch panel. The voice outlets are meant, not only for telephone connections, but also for fax machines, ISDN connections, modem connections and Internet connections. The outlets are designated as Data, Paging, and Camera & Access Point as per the requirement. All outlets are fully interchangeable.

2.1 MDF AND BUILDING WIRING DESCRIPTION

MDF (Main Distribution Frame) is located in room C09 and serves outlets for the entire building. All cables are wired in star topology with an RJ-45 connection at the station side location of the cable and an RJ-45 onto the respective patch panel in the wall rack in the MDF (room 126).

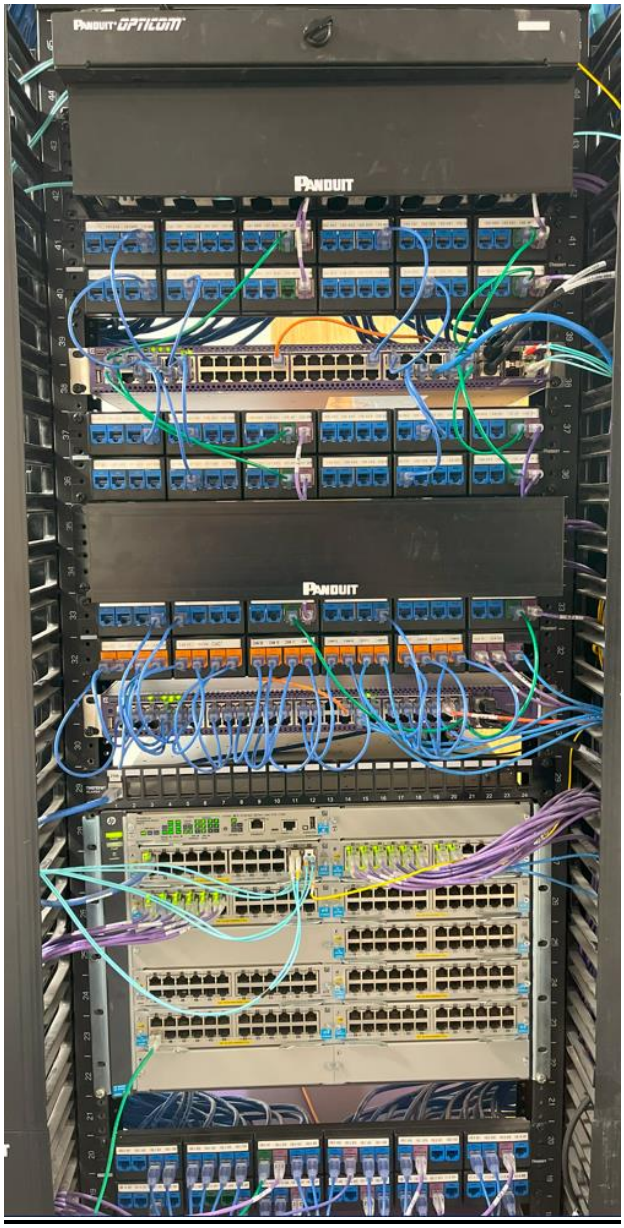
2.2 CABLING FOR WORKSTATIONS (HORIZONTAL CABLING SYSTEM)

Each workstation outlet has:

- Triple, Dual or Single Points terminated with RJ 45 sockets(Recommended 7 - 10 cm length cable for any re-termination)
- The above RJ-45 sockets have Category 6 Connector (Modular Data, Voice, Video, IP Paging, WiFi Access Point, or IP Camera outlet) Connectors. The line cords for Computers/ telephones/ IP Devices are plugged in to these R-J45 sockets
- The Cat6, 8-positions connector is wired as per EIA/TIA 568B configuration

- The above category 6 cables, leading from ALL data outlets on the floor sockets are terminated on to a RJ-45 connector on a patch panel
- The cable between the work area and the Patch panel is called “Horizontal Cable”.
- The patch panels, where the data (Modular Data, Voice, Video, IP Paging, WiFi Access Point, or IP Camera outlet) cables are terminated is fitted in a 19” cabinet.
- The cross-connections of the data outlets to the switches (or other devices) in the cabinets/racks is done by plugging the RJ45-RJ45 patch cords in to the selected sockets on patch panel and any appropriate port of the switch (or other devices).

Typical arrangement of Patch Panel Installation:



Horizontal Cabling: As mentioned earlier, the horizontal cabling is that portion of the system which links the telecommunications closet to the work area, with a 4 pair UTP cable. The maximum length allowed for horizontal cables is 300 feet.

Work Area: The work area is that building space where the occupants interact with telecommunications Terminal Equipment. The work area sub-system includes a variety of hardware (not in present scope) such as a terminal, PC, or workstation or a server or a telephone instrument. This hardware is plugged in to the telecom outlet through a modular line cord (patch cord).

2.3 BACKBONE CABLING (VERTICAL CABLING SYSTEM)

Backbone cabling provides interconnections between telecommunication room, equipment rooms, and entrance facilities.

3 MEASURED DATA

The measured data for each horizontal cable link is that which is measured from the modular connector at the faceplate up to the patch panel.

The measured data comprises of the following:

i. Wire map: The correct wire map ensures that there is no cross connection or mismatch of pairs between the terminations at the two ends of the cable. The terminations at MDVO connectors are made to EIA/TIA 568B configuration.

ii. Length of the cable: The length of the cable from faceplate to the patch panel should be within 90 meters, for compliance with EIA/TIA standards.

iii. Propagation delay

iv. Impedance of the cable in ohms

v. Resistance of the cable in ohms.

vi. Capacitance in Farads.

vii. Attenuation in Decibels.

viii. Return loss of signal at scanner end, in decibels.

ix. Return loss of signal at injector end, in decibels.

x. NEXT (Near End Cross Talk) in decibels.

xi. ACR (Attenuation to Cross Talk Ratio)

The test results are automatically recorded in the testing equipment and are saved for future reference/print outs.

4 MEASUREMENT POINTS

The above mentioned test data results are measured from each end of each cable connection between:

i. Modular connector at the faceplate of the data/voice outlet.

ii. Corresponding patch panel port in the telecommunications room.

5 TEST EQUIPMENT USED

A two-way cable analyzer is used to test each cable link. All the cables are tested with the analyzer. The test is done on 100% cable links. By using of FLUKE networks VERSIV scanner, USA made, is used to test the connectivity of each cable link.

The FLUKE networks Scanner is capable of performing all the tests mentioned above in section 3.

This cable analyzer automatically compares the tested results with the international standards, which are stored in the analyzer and are preset. The results are displayed as PASS or FAIL depending upon the outcome of the comparison between the standards and the actual results. In case of FAIL results, the analyzer display shows the exact cause of failure so that the fault of the cable link can be easily rectified.

The cable link fault that is known from the display of the analyzer is rectified and the test is conducted again till the display shows PASS. Thus the results of all the cable links are made within acceptable limits.

The test results are automatically recorded in the testing equipment and are saved for obtaining print outs later.

6 OPERATION

6.1 CROSS-CONNECTION

The operation of the structured cabling system mainly involves cross-connections to activate any chosen outlet for the desired type of service to effect moves and changes. **For example**, if you identify an outlet and wish to use the outlet for a Mitel IP telephone, you only need to cross-connect the outlet to a switch port configured appropriately for a Mitel IP telephone by means of an RJ45-RJ45 patch cord.

6.2 CALIBRATION AND TESTING

The structured cabling system, as installed, does not need any further testing, after the testing 100% done at the time of installation.

6.3 ADJUSTMENTS

The adjustments in Structured Cabling System for Data, Voice and CATV system relate to "Moves, Additions and Changes". The system administrators' major concern is for the above three aspects, where people and / or equipment is relocated within the organization. The Structured Cabling system allows these operations to be completed generally with minimum or no interruption to existing network users.

In most cases, cross connections between the equipment and distribution fields can be accomplished without compromising system integrity. However, prior to performing changes involving connections at MDF (Main Distribution Frame) or between equipment fields of telecommunications closets, please consult the installers. This will ensure that changes performed will conform to system specifications.

Moves, additions and changes involve appropriate cross –connections at the telecommunications closet and or at the MDF. In order to implement these, it is imperative to maintain accurate records of the communications facilities. It is suggested that trained personnel who are conversant with the installation should be permitted to effect any changes.

7 SYSTEM MAINTENANCE

The following table summarizes the level of skills needed to perform different operations for the structured cabling system, all operations involving changes of service MUST be performed only by the installers or by trained in-house personnel. The operations at patch

panel can be done by anyone without a formal training. Authorized persons should also do recording of any changes.

7.1 ROUTINE MAINTENANCE OPERATIONS

	At patch panel	At BIX Mount
Additional Service	Any one	Trained personnel or installers
Removal of Service	Any one	Trained personnel or installers
Change of location of workstation	Any one	Trained personnel or installers
Record Keeping Electronically / Manually	Authorized Personnel	Authorized Personnel

7.2 OTHER MAINTENANCE OPERATIONS

Operation	**Recommended Persons**
Addition of new drop	System Installers
Termination / Re-termination of drop	System Installers or In-House Trained Personnel
Moves, additions & changes to horizontal system	System Installers or In-House Trained Personnel
Moves, additions & changes to backbone system	System Installers or In-House Trained Personnel
Moves, additions, & changes to building entrance system	Local Telephone / Cable / Internet provider.

If any problems are encountered, the following things should be ensured:

a. Ensure that the workstations and other electronic hardware items (e.g. hub, switches, IP telephones, etc.) are properly connected and configured according to manufacturer's instructions.

b. Ensure that line cords / patch cords (appropriate type) with necessary adapters are used and connected properly. These line cords are checked at the time of manufacture.

c. Ensure that cross –connection (patching) is done properly.

If any further problems are encountered, please contact the installers of the Structured Cabling System.

8 PREVENTIVE MAINTENANCE TASKS

The basic preventive maintenance tasks are given below:

a. Periodic maintenance involving the general cleaning (vacuum suction cleaning and inspection of the system should be carried out by in –house personnel.

b. Checks for damage that may be caused by improper plugging of line cords /patch cords can be done whenever any difficulty in use of the workstation equipment is reported (e.g. Network connection sometimes on and sometimes off, etc). Check the physical condition of the patch cord or line cord especially at the connector end. Replace if found defective.

c. Ensure that the patching is done correctly to same outlet and corresponding connector in patch panel.

Other than above, the system is maintenance free unless a fault situation occurs due to external reasons in which case the installer should be called to rectify the fault. For effective and efficient operation and maintenance of the structured system, it is highly recommended that all the concerned personnel should be properly trained.

9 MAINTENACE SUMMARY

It is recommended to follow the below given schedule for maintenance of the Data / Voice / CATV structured cabling system:

a. Quarterly- General cleaning by vacuum method The period may be changed depending upon dust and environment conditions

b. Yearly- Cross-connections after any changes are done

c. Once in 2 years- System inspection by in–house trained Personnel. Verifying that the records are made up to date.

10 RECORD KEEPING

A wide variety of services such as Voice, Data, CCTV, Paging, etc systems are used by means of the structured cabling system.

Effective management and proper recording of communications facilities reduces down time of network and cuts down material and labor costs. Hence every move, addition and change at IDFs, MDF and the telecom closet must be recorded either manually or

electronically, for operational, administrative and maintenance reasons. Generally, the maintenance of the cabling system involves the following elements to be recorded.

10.1 TERMINATION HARDWARE

Communication outlets

Patch Panels

10.2 LOCATION OF CLOSETS (MDF, IDF, ETC)

10.3 CONNECTED EQUIPMENT

Computers

Switches, routers, and other network equipment

Camera equipment

Paging equipment

Wifi Equipment

10.4 PERSONNEL RECORDS

Name, telephone number (or telephone extension number, room number, equipment identification, services.

10.5 EXCHANGE OF COMPONENTS AND ASSEMBLIES

The RJ 45 Modular Data/Voice/CATV outlet connectors and the face plates can be exchanged between different outlets provided they are of same type and color and model number.

11 SPECIAL TOOLS, TEST EQUIPMENT

No special tools are needed for effecting changes, moves, additions of the workstations in this project, since patch cords with RJ45 pluggable connectors are supplied in this project. These patch cords can be easily inserted in the RJ45 ports of the patch panel as well as the active equipment.

12 INSTALLER INFORMATION

TechOptics, Inc.

463 Bankhead Hwy.

Winder, GA 30680

http://www.techoptics.net/

Phone: 770-867-1777

Fax: 770-868-0111

Service Email: service@techoptics.net

General Email: info@techoptics.net

13 EMERGENCY INFORMATION

Since the structured cabling system comprises of passive components only, no emergency situation for the usage of the system in envisioned.

However, in case of emergency due to other related matters, please contact our office using the information is section 12.

14 MANUFACTURER'S GUARANTEES & WARRANTIES

The Panduit / Prysmian / General Cable components installed in this Structured Cabling System project are warranted against any manufacturing defect for a period of 25 years from the date of installation. For the same period, these components are warranted to meet the requirements of TIA 568-B specifications for commercial building cabling, subject to the system and the components being used as installed without any changes. Damages due to reasons beyond the control of the manufacturers and the installers etc. are excluded.

The installer, TechOptics, Inc. of Winder, GA warrants the labor and installation of products for a period of one year from the installation date.

15 RECOMMENDED SPARES

Since the system is warranted by Panduit and Prysmian for 25 years from defects, it is not considered essential that the client should hold a stock of spare parts.