

## WRITING TELECOMMUNICATION SPECIFICATIONS

ALL DATA COMMUNICATION SYSTEMS HAVE THE FOLLOWING COMPONENTS

- SOURCE OF DATA (TRANSMITTER / LINE DRIVER)
- COMMUNICATION LINK (TRANSFER THE MESSAGE TO RECEIVER AT THE OTHER END IN FORM OF VOLTAGE)
- THE RECEIVER OF THE DATA WHERE THE SIGNAL CONVERTED BACK INTO A FORM THAT CAN BE USED BY LOCAL ELECTRONICS CIRCUITRY.

## IMPORTANT FACTS IN WRITING OF TELECOMMUNICATION SPECIFICATIONS

- THE TYPE OF ELECTRICAL SIGNAL USED TO TRANSMIT THE DATA
- THE TYPE OF CODES USED FOR EACH SYMBOL BEING TRANSMITTED

- THE MEANING OF THE SYMBOLS
- HOW THE FLOW OF DATA IS CONTROLLED
- HOW TO DETECT AND CORRECT ERRORS.

## INTERFACE

THE PHYSICAL ITEMS

## PROTOCOL

TYPE OF CHARACTERS BEING TRANSMITTED.

## TRANSMISSION MEDIA

THERE ARE FOUR TYPES OF MEDIA THAT CAN BE USED IN TRANSMITTING INFORMATION

- COPPER WIRE
- COAXIAL CABLE
- OPTICAL FIBRE
- WIRELESS

LOADING - LOAD COILS ARE FREQUENTLY ADDED TO LOOPS LONGER THAN 5.4 km

LOAD COILS ARE LOW PASS FILTERS.

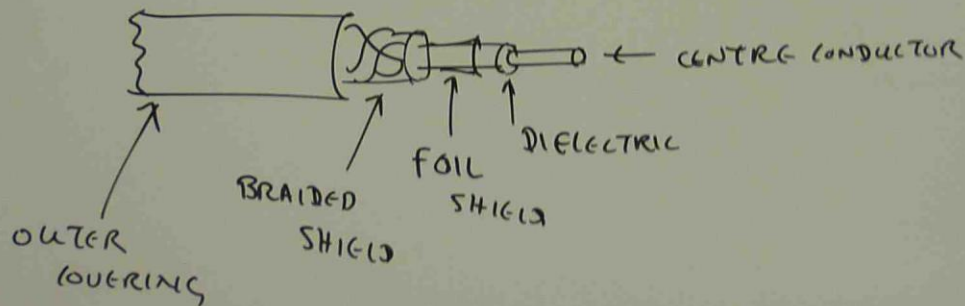
BRIDGE TRAPS - CABLE PAIR CONNECTION  
EXTENSION

### COAXIAL CABLE

COAXIAL CABLE CONSISTS OF A SINGLE STRAND OF COPPER RUNNING DOWN THE AXIS OF THE CABLE

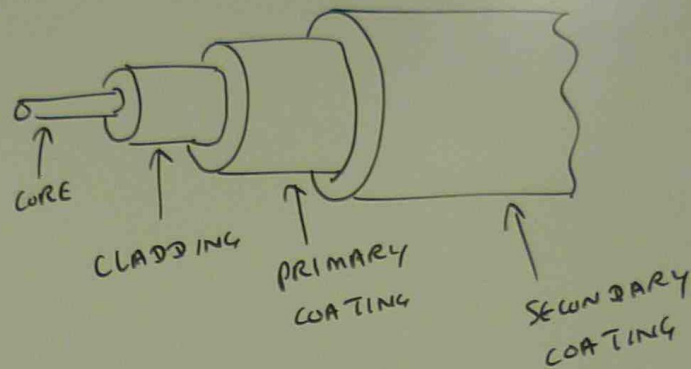
OUTER SHIELDING BY INSULATOR

TV CHANNEL - 6 MHz



## FIBRE

TRANSMISSION SPEED 9.9 GPs



WRITING THE SPECIFICATION FOR TELECOMMUNICATION SYSTEM

- THE TYPES OF ELECTRICAL SIGNAL
- TYPE OF LOAD
- TYPE OF TRANSMISSION MEDIA
- TYPE OF INTERFACE
- TYPE OF PROTOCOL TO BE SPECIFIED
- THE KIND OF SWITCHING SYSTEM



## TYPE OF END-OFFICE SWITCHING AND ACCESSORIES

SWITCHING SYSTEM	OPERATION	METHOD OF SWITCHING	TYPE OF CONTROL	TYPE OF NETWORK
MANUAL OPERATOR	MANUAL	SPACE / ANALOGUE	HUMAN	PLUG / CORD / JACK
STEP-BY-STEP	ELECTRO MECHANICAL	SPACE / ANALOGUE	DISTRIBUTED STAGE BY STAGE	STEPPING SWITCH TRAIN
CROSS BAR	ELECTRO MECHANICAL	SPACE / ANALOGUE	COMMON CONTROL	CROSS BAR SWITCH
ESS ELECTRONIC SWITCHING SYSTEM	SEMI ELECTRONIC	SPACE / ANALOGUE	COMMON CONTROL	REED SWITCH
			STORED PROGRAM CONTROL	REED SWITCH
	ELECTRONIC	TIME / DIGITAL	STORED PROGRAM COMMON CONTROL	PULSE CODE MODULATION

## PACKET SWITCHING

THE INFORMATION BEING TRANSMITTED IS NOT SENT IN REAL TIME OVER A DEDICATED CIRCUIT. IT IS STORED IN A NEARBY COMPUTER UNTIL A SUFFICIENTLY SIZED PACKET IS ON HAND.

- CREDIT CARD VERIFICATION, ATM, SIGNALLING SYSTEM  
INTERNET AND WORLD WIDE WEB

## DIGITAL TRANSMISSION AND SWITCHING

BROAD BAND IS IN SERVICE

ASYNCHRONOUS TRANSFER MODE (ATM)

HIGH SPEED NETWORK WITH 155 mbps TO 622 mbps

## STANDARD ORGANIZATIONS

CLOSED SYSTEM - INTERNAL COMMUNICATION

OPEN SYSTEM - TELEPHONE NETWORKS

ISO - INTERNATIONAL ORGANIZATION FOR STANDARDISATION

ITU-TSS - INTERNATIONAL TELECOMMUNICATION UNION - TELECOMMUNICATION STANDARDISATION SECTOR

ANSI - AMERICAN NATIONAL STANDARD INSTITUTE

IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS.

TO WRITE THE TELECOMMUNICATION SPECIFICATIONS, THE RULES AND REGULATIONS SET BY THOSE ORGANIZATIONS ARE TO BE REFERRED.

# INTERNATIONAL TELECOMMUNICATION STANDARD

CCITT

## GROUP (3)

UNIVERSAL PROTOCOL FOR SENDING FAX DOCUMENTS ACROSS TELEPHONE LINE

## GROUP (4)

A PROTOCOL FOR SENDING FAX DOCUMENT OVER ISDN NETWORK.

V.21 STANDARD FOR FULL DUPLEX COMMUNICATION (300 BAUD IN JAPAN & EUROPE)  
USA - BELL 103

V.22 HALF DUPLEX COMMUNICATION AT 1200 bps IN JAPAN AND EUROPE  
USA - BELL 212A

V.29 HALF DUPLEX MODEM, SENDING & RECEIVING DATA ACROSS  
TELEPHONE LINES AT 1200, 2400, 4800, 9600 bps

V.32 FULL DUPLEX MODEM SENDING AND RECEIVING DATA ACROSS  
PHONE LINES AT 4800 (OR) 9600 bps

V.34 FULL DUPLEX MODEM SENDING AND RECEIVING DATA  
ACROSS PHONE LINE AT 28800 bps

V.42 ERROR DETECTION STANDARD FOR HIGH SPEED MODEM

V.90 STANDARD FOR FULL DUPLEX MODEM SENDING AND RECEIVING DATA ACROSS PHONE LINES AT 56600 bps

X.25 PACKET SWITCHING PROTOCOL FOR WAN

X.400 UNIVERSAL PROTOCOL FOR EMAIL

X.500 ADDRESSING FORMAT SO ALL EMAILS CAN BE LINKED TOGETHER.



## ELECTRICAL CONTRACTING

### INSURANCE

APPROPRIATE INSURANCE COVER FOR ALL EQUIPMENTS, ASSETS, TOOLS, MATERIALS, STAFF AND PROFESSIONAL SERVICE MUST BE ARRANGED.

THE INSURANCE COVER NEEDS TO BE REGULARLY UPDATED DEPENDING ON MARKET VALUE OF ASSETS, EXPANSION AND COMPLEXITY OF THE ELECTRICAL SERVICE.

### THREE MAIN TYPES OF INSURANCE

- GENERAL LIABILITY COVERAGE
- COMPREHENSIVE AUTOMOBILE LIABILITY COVERAGE
- WORKMEN'S COMPENSATION COVERAGE.

## GENERAL LIABILITY COVERAGE

SUPPLEMENTARY PACKAGE MAY BE REQUIRED FROM TIME TO TIME DEPENDING ON EXPANSION (OR) CHANGING NATURE OF THE CONTRACT WORKS.

## COMPLETED OPERATION COVERAGE

A GENERAL LIABILITY COVERS LOSSES WHILE THE CONTRACTOR IS ON THE JOB BUT NOT AFTER.

COMPLETED OPERATION COVERAGE FILLS THIS GAP

## BROAD FORM OF PROPERTY DAMAGE COVERAGE

IT COVERS THE DAMAGE TO ANOTHER PERSON'S PROPERTY WHILE WORKING ON SITE.

## XCU COVERAGE

EXPLOSION, COLLAPSE, UNDERGROUND. IT IS IMPORTANT

FOR CONTRACTOR WHO DOES A LOT OF UNDERGROUND WORK.

## MANAGEMENT SUCCESSION

THE NEXT GENERATION OF MANAGEMENT MUST BE TRAINED TO DO THE WHOLE JOB IF THE COMPANY IS TO SURVIVE.

## INVESTMENTS

- CONTRACTOR'S ASSETS, TOOLS, TECHNOLOGIES, RESOURCES, RISKS
  - STAFF DEVELOPMENT
  - OUTSIDE INVESTMENTS
- OUTSIDE INVESTMENT REQUIRES CAREFUL PLANNING AND CARE.

