# RS485

# Teknik Antarmuka Komputer (TKE 4145)

Eka Maulana

maulana.lecture.ub.ac.id

# Topics of Discussion

- Background on RS422 and RS485
- Converting RS232 to RS485
- The Benefits of RS485
- Making it Robust
- Programming DDE

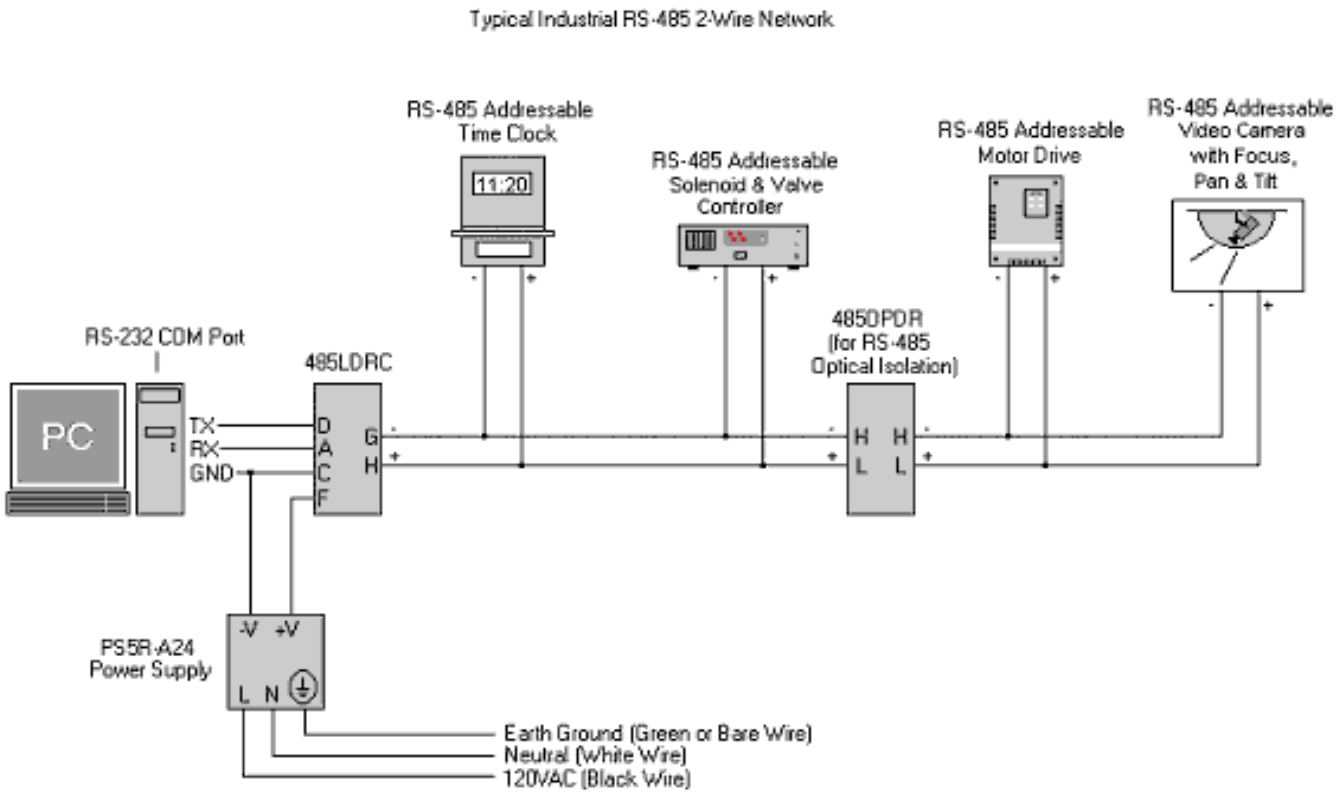
# Perbandingan RS 232 dan 485

| KEY CHARACTERISTICS OF THE RS-232 AND RS-485 SERIAL INTERFACES | | |
|---|---|---|
| **Parameter** | **RS-232** | **RS-485** |
| Line configuration | Single-ended | Differential |
| Mode of operation | Simplex or full duplex | Simplex or half duplex |
| Maximum cable length | 50 feet | 4000 feet |
| Maximum data rate* | 20 kbits/s | 10 Mbits/s |
| Typical logic levels | ±5 to ±15 V | ±1.5 to ±6 V |
| Minimum receiver input impedance | 3 to 7 kΩ | 12 kΩ |
| Receiver sensitivity | ±3 V | ±200 mV |

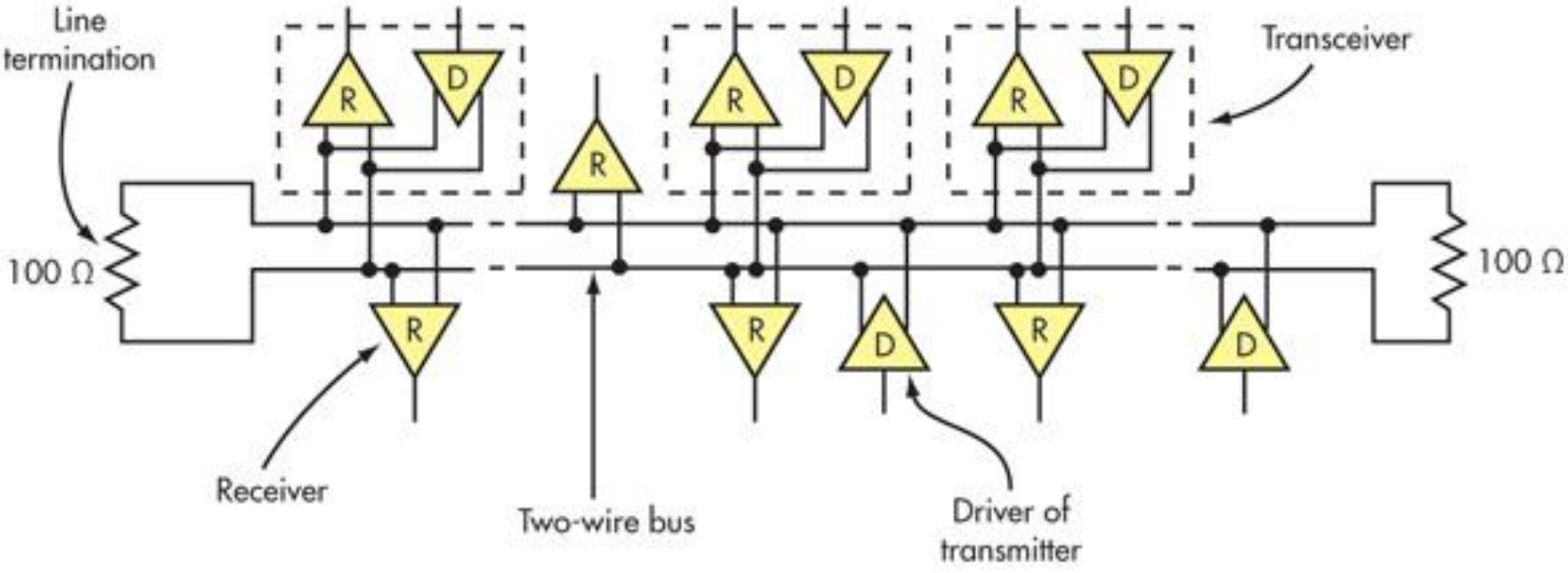
* Maximum rate at maximum cable length

# Background on RS485

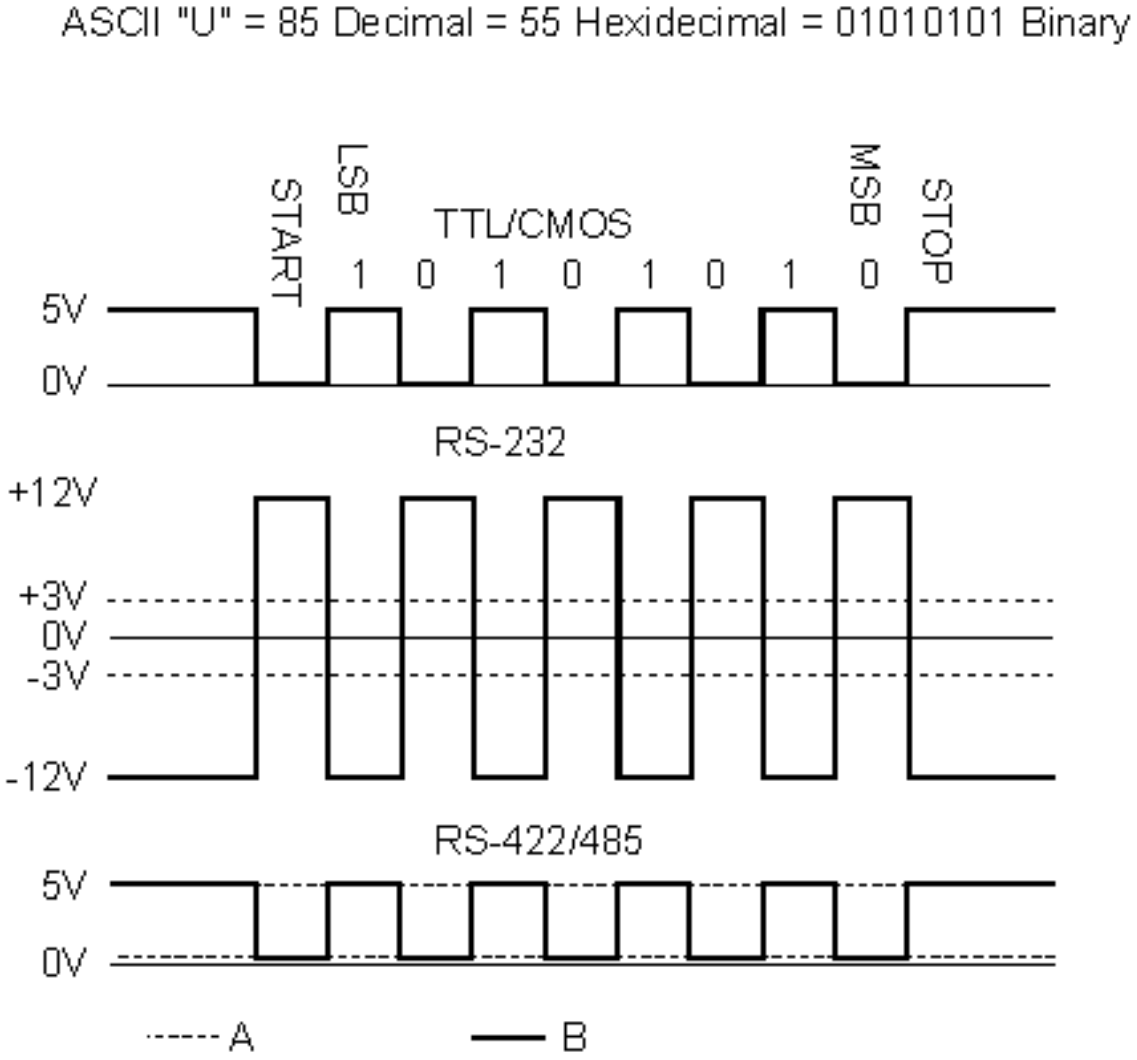
- Building management, Dedicated print networks
- Security Systems, Camera Control.



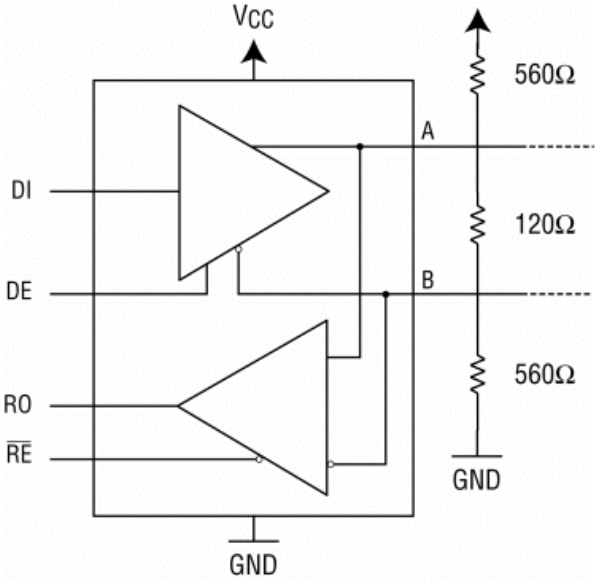
# Tranceiver – Driver & Receiver

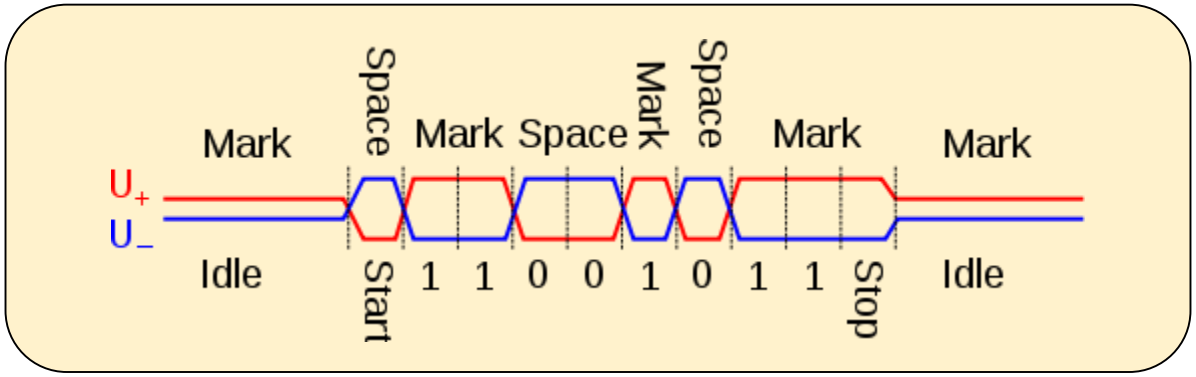


# RS485 levels



# Waveform


Vcc
560Ω
A
DI
120Ω
B
DE
560Ω
RO
RE
GND
GND


Mark
Space
Mark
Space
Mark
Space
Mark
Mark
U+
U−
Idle
Start
1
1
0
0
1
0
1
1
Stop
Idle

# Benefits of RS485

- Multidrop: 32 devices on a single line without boosting
- Runs on a single 5 Volt rail
- Data-rate of 100KBps at 5,000 Feet
- Differential line means it has High noise immunity
- Easily implemented
- Can be easily made robust in harsh environments

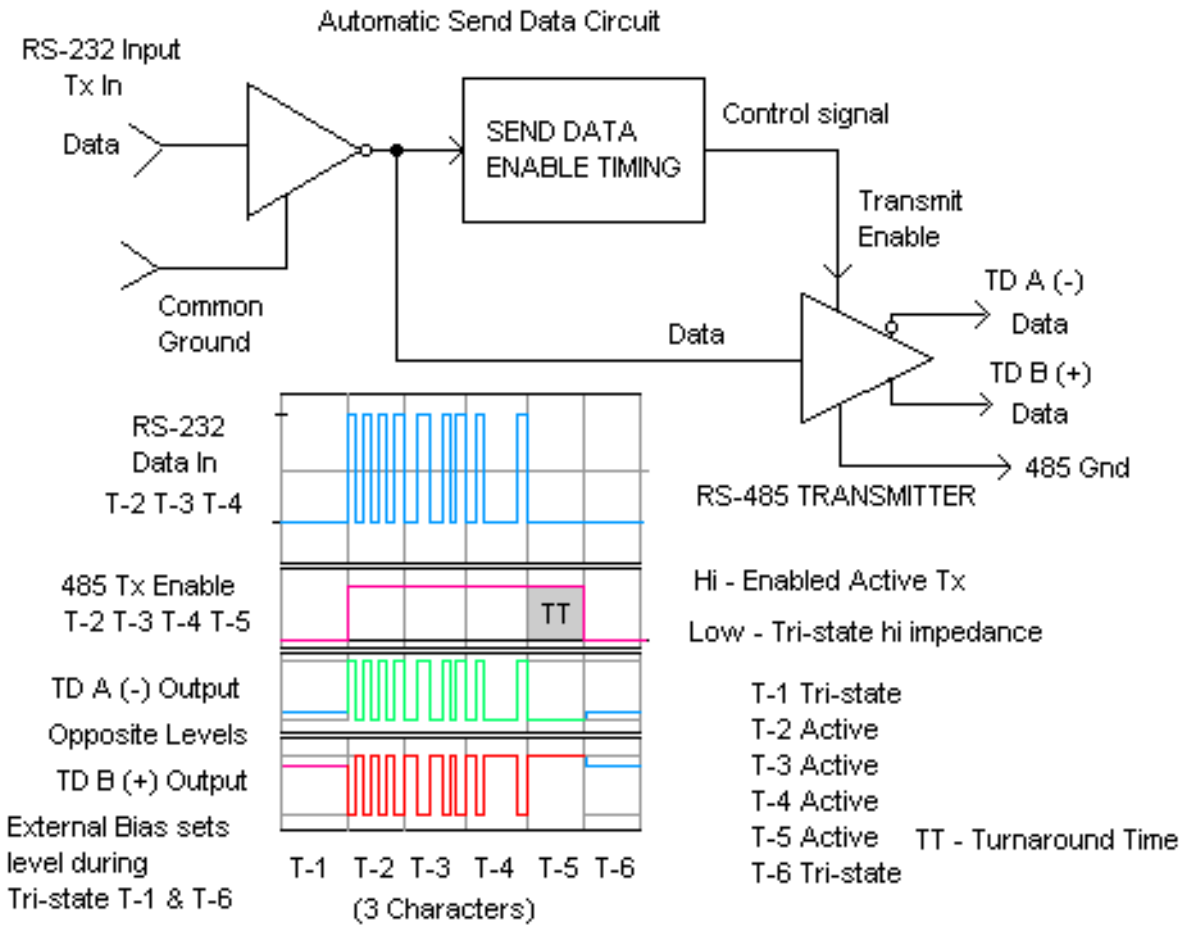
- The actual data format and type of network can be any level of complexity (Master Slave is the easiest)

# Converting RS232 to RS485

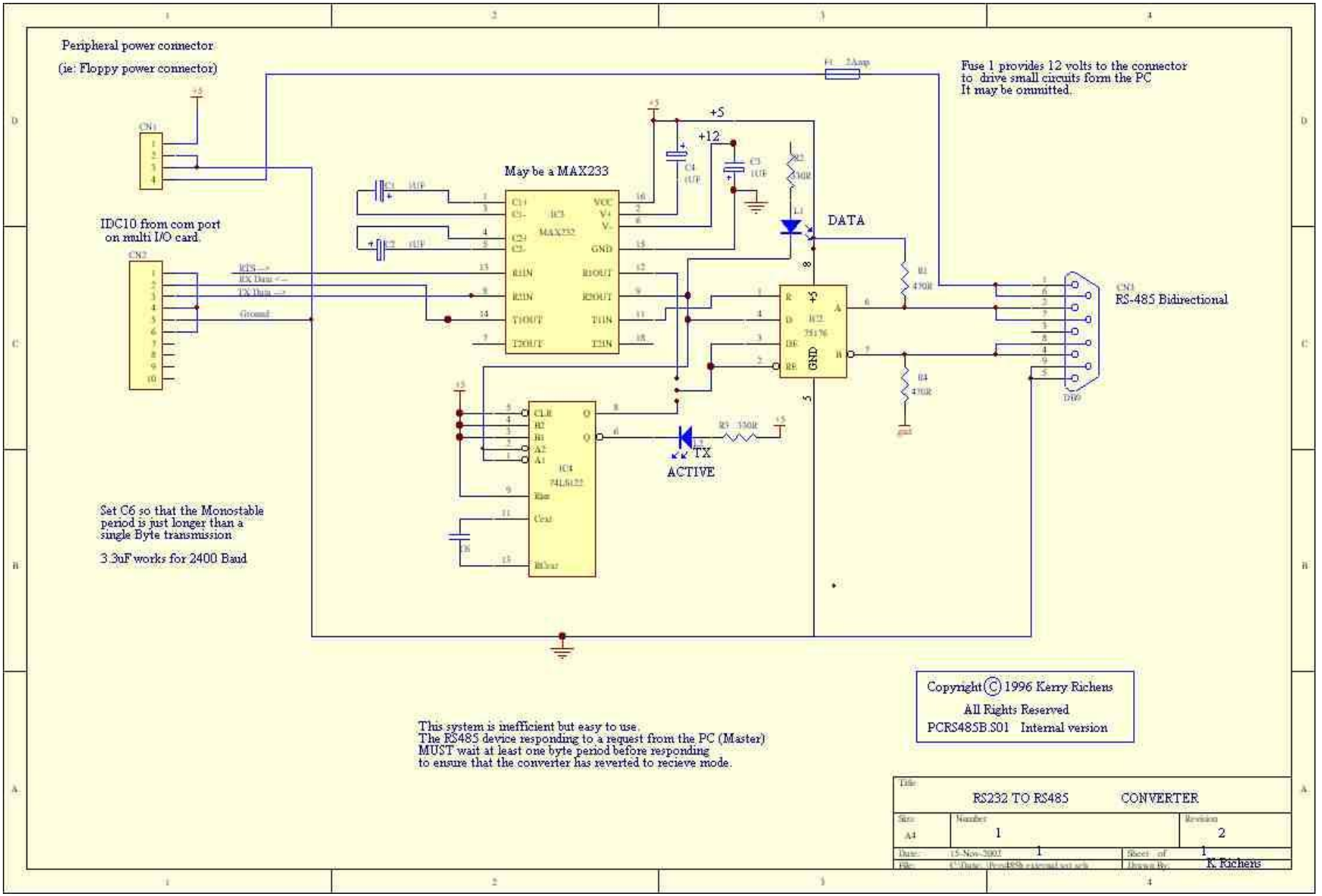
There are 2 types of send control systems.

Automatic

RTS/Software

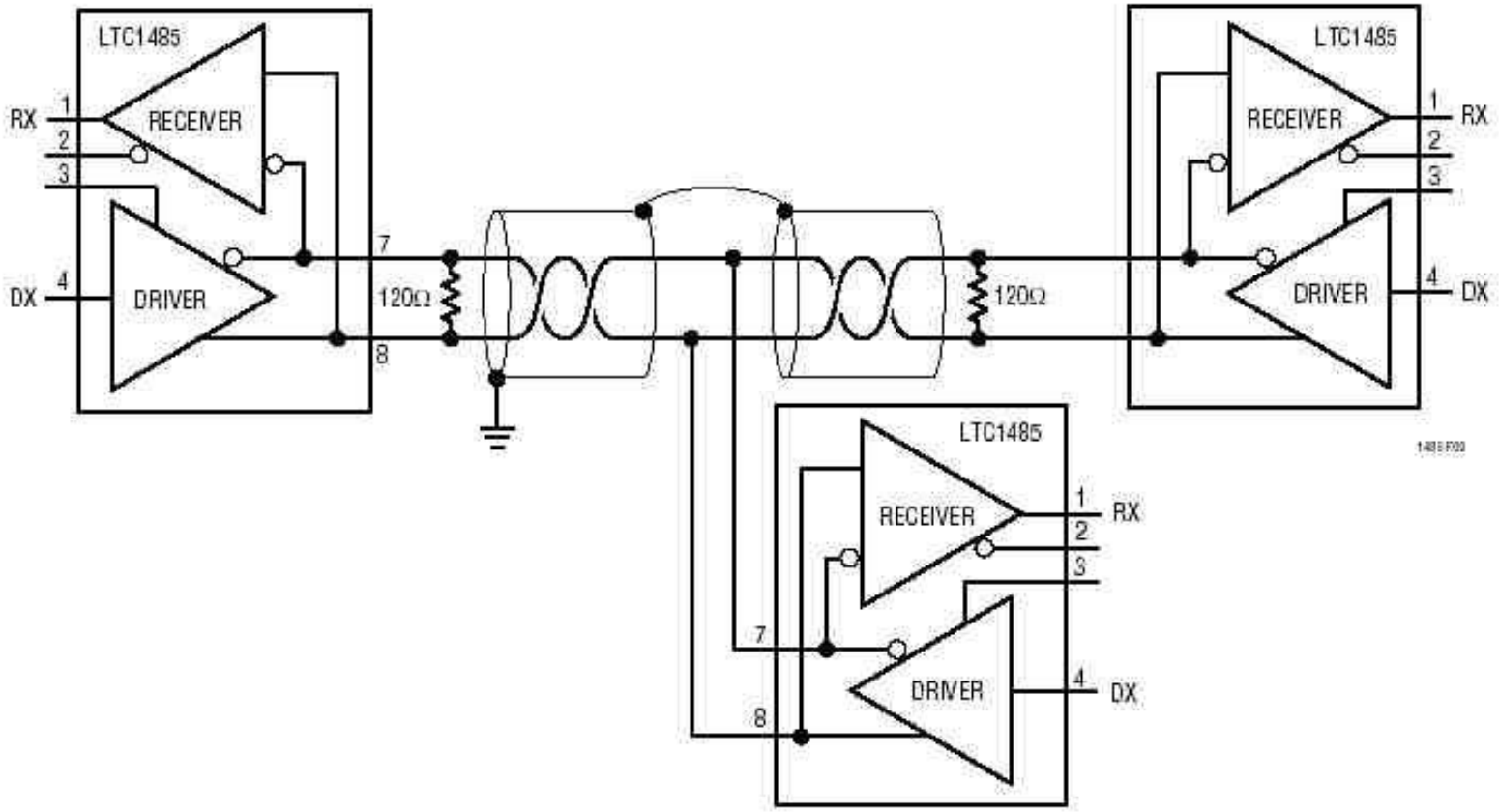


# Converter Schematic



# The 75176 Line Transceiver

An example of a simple network



# Active Termination

- When the Master is inactive the line is completely tristated.
- The line must be actively forced to a ‘0’ to ensure that noise does not present as data to the slaves.

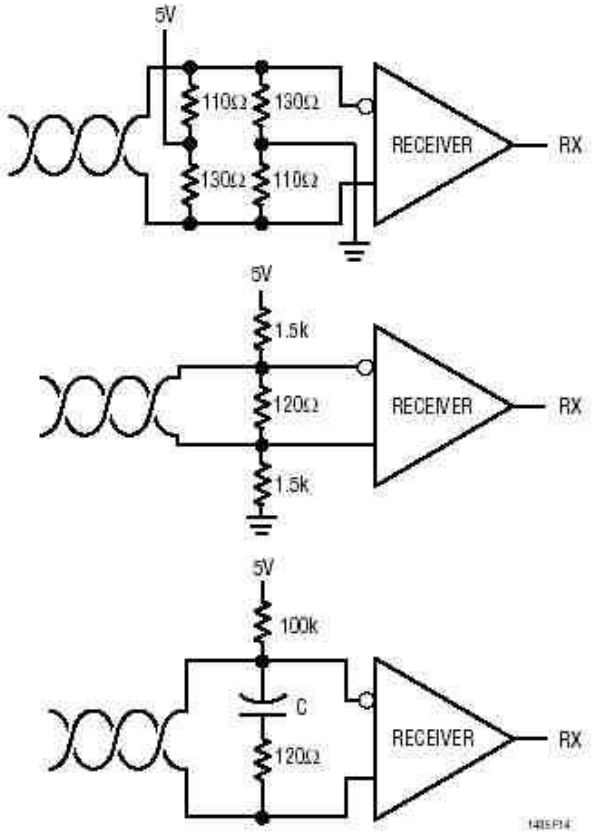
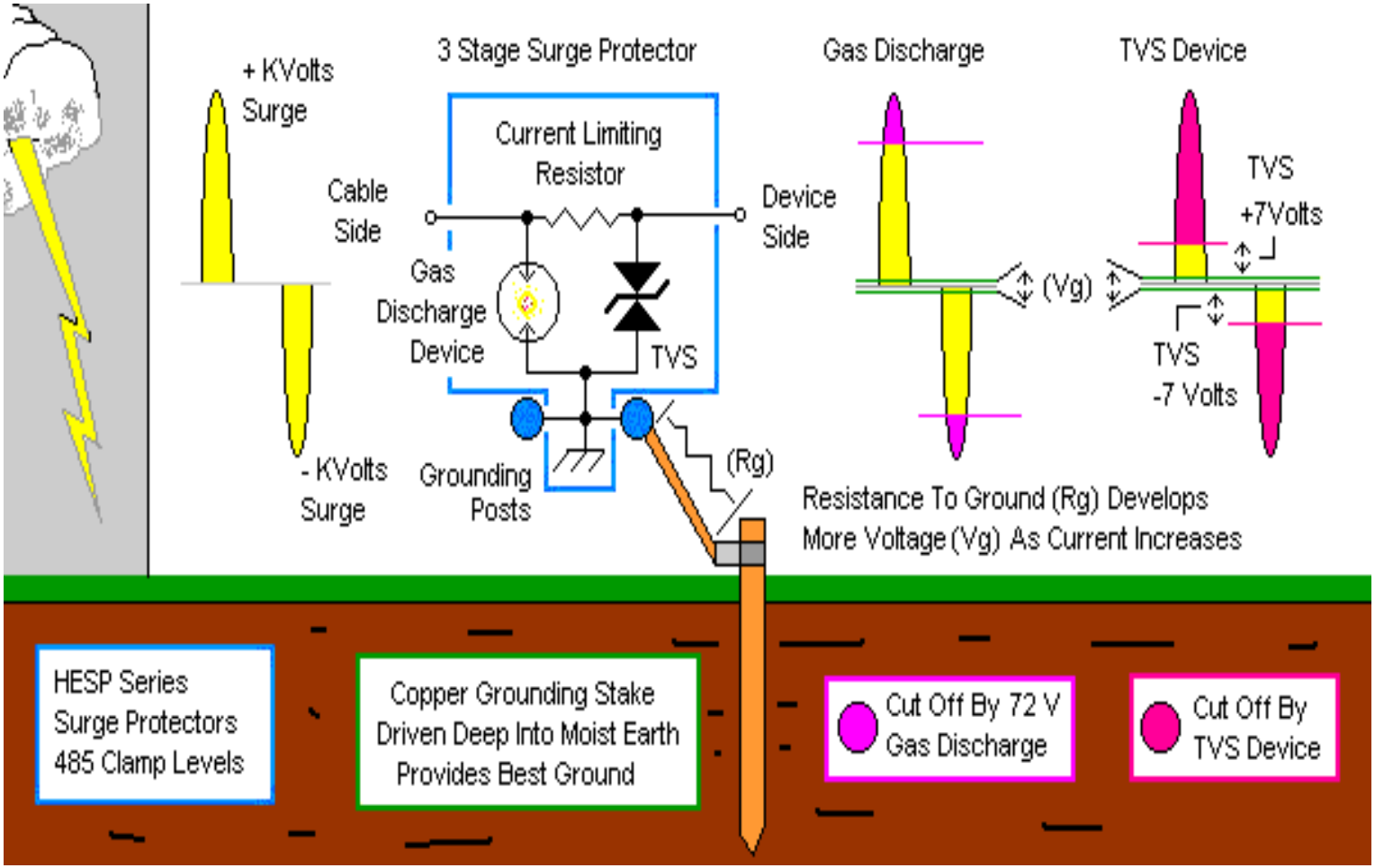



Figure 14. Forcing "0" When All Drivers Are Off

# Example: Common Ground Surge Protection

- An example of single wire protection.



# Optical Isolation