2008
Many Changes in IEEE C37.2

IEEE Standard Electrical Power System Device Function Numbers, *Acronyms* and Contact Designations

Major revisions – first since 1995

Substantial additions

1 - New – ten more suffix letter combinations

2 - New – seventeen acronyms for new functions

3 - New – use of Device #16 for substation data comm

4 – New – “List Box” method to describe Device 11

5 – New – Large cross reference table to IEC 61850

6 – New (to C37.2) Coordinated Trip & Close Fusing

Work done by joint PSRC/PES Substations WG

Soon to be published (by October 2008)

Ten new (to C37.2) suffix letters or combinations

- BU – Back up
- DCB – Directional comparison blocking
- DCUB – Directional comparison unblocking
- DUTT - Direct underreaching transfer trip
- GC - Ground check
- POTT - Permissive overreaching transfer trip
- PUTT - Permissive underreaching transfer trip
- SOTF - Switch on to fault
- TD - Time delay
- Z - Impedance

Seventeen Acronyms for New C37.2 Functions

AFD – Arc Flash Detector
CLK – Clock or timing source
DDR – Dynamic Disturbance Recorder
DFR – Digital Fault Recorder
ENV – Environmental data
HIZ – High Impedance Fault Detector
HMI – Human Machine Interface
HST – Historian
LGC – Scheme logic (the function, as in a RAS– not a device like a PLC)
MET – Substation Metering
PDC – Phasor Data Concentrator
PMU – Phasor Measurement Unit (the function)
PQM – Power Quality Monitor
RIO - Remote Input/Output Device
RTU – Remote Terminal Unit / Data Concentrator
SER – Sequence of Events Recorder
TCM – Trip Circuit Monitor

TCM – Trip Circuit Monitor

- Today's red light on a relay or control panel signifies what?
  - Circuit breaker is closed
  - What else? Tripping voltage? Trip coil intact?
  - None of these if just fed from a 52a contact

TCM definition

A device / function that monitors an associated circuit breaker's trip circuit for continuity and for the presence of tripping voltage, and sets an externally readable alarm when continuity or tripping voltage is lost.

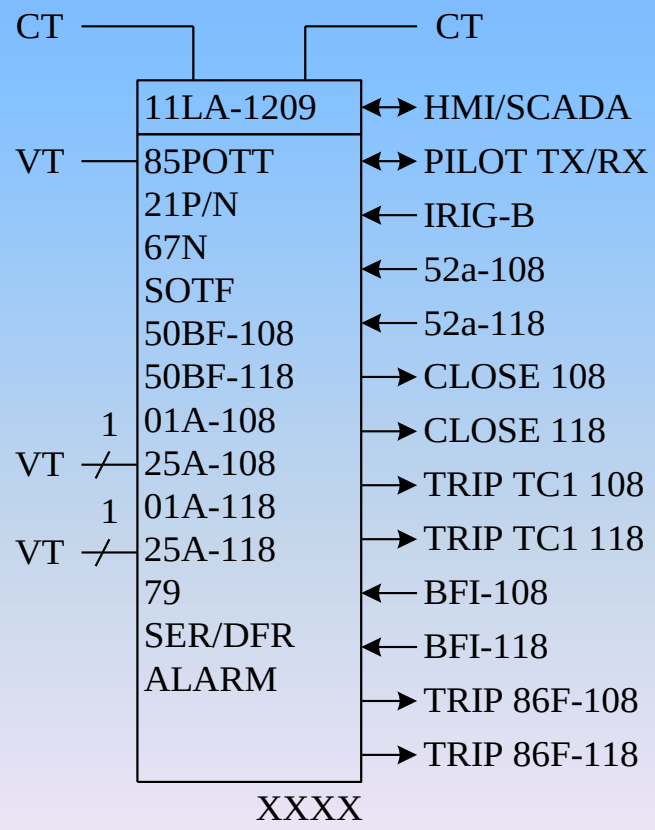
New Device # - IEEE C37.2 Device 16 Data Communications Device with its own set of suffixes

"A device that supports the serial and/or network communications that are a part of the substation control and protection system "

- First suffix letter S (= serial device) or E (= Ethernet device)
- Subsequent suffix letters:
  - C – Security processing function (VPN, encryption, etc.)
  - F – Firewall or message filter function
  - M – Network managed function (e.g., configured via SNMP)
  - R – Router
  - S – Switch (Examples: Port switch on a dial up connection is 16SS, an Ethernet switch is 16ES)
  - T – Telephone component (Example: Auto-answer modem)
- Combinations - 16ERFCM = Ethernet Router / Firewall / VPN / Network Managed

New - **List Box Method of describing contents of a Multifunction Device 11:**

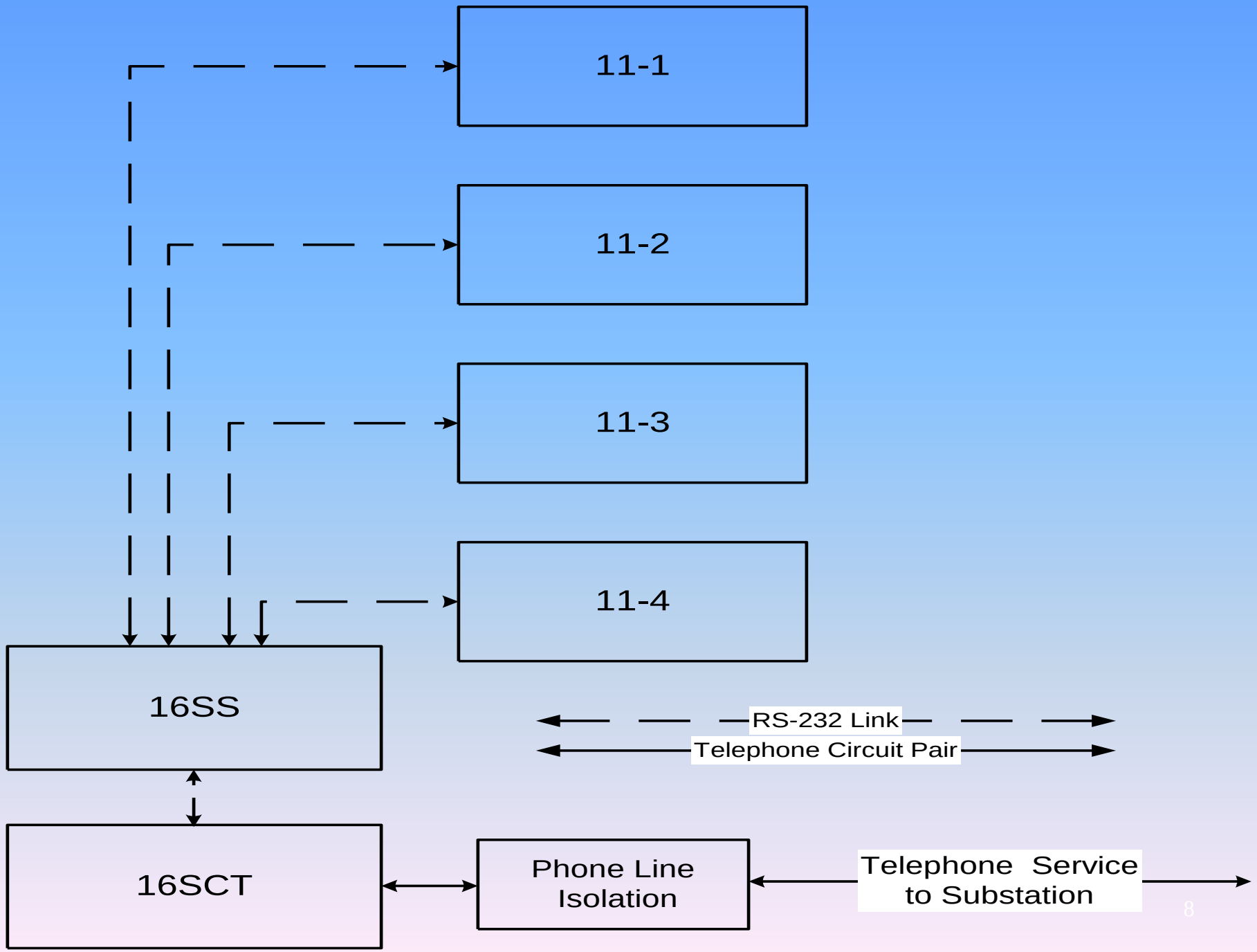
(Example is for System A in a dual redundant scheme for Line 1209 served by bus breaker 108 and mid breaker 118 in a breaker and a half substation. There would be a similar list box for System B . XXXX = mfgr model number

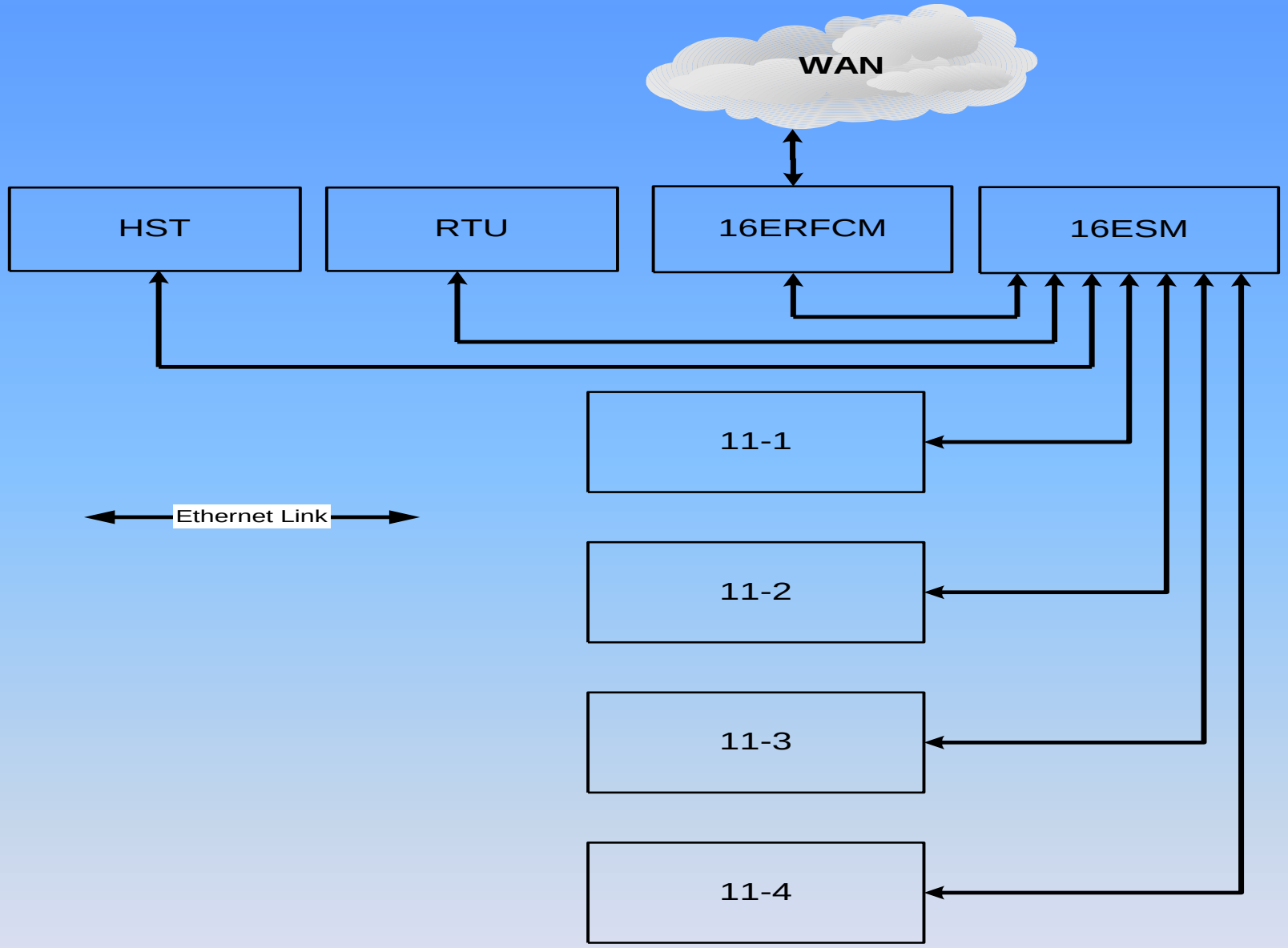


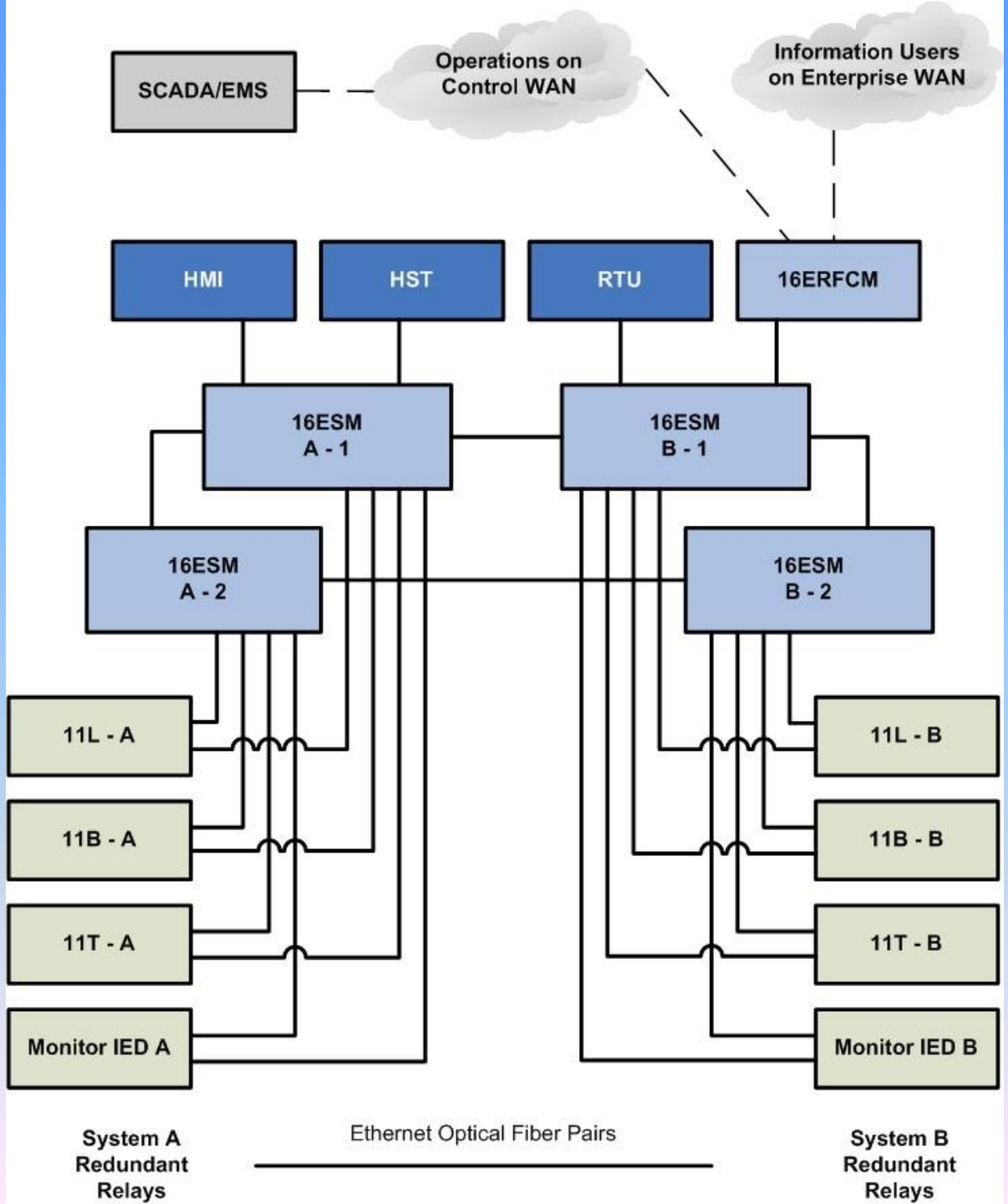
NOTES:

1. AC sensing connections are 3-Phase unless otherwise marked.
2. Functions apply to the multifunction device's designated zone of protection unless otherwise marked.
3. A/B designate System A and System B of the fully redundant system.
4. Device 01 is manual control of the designated power system element.

01A is local HMI and panel control.
01B is remote SCADA control.


11-1
11-2
11-3
11-4
16SS
RS-232 Link
Telephone Circuit Pair
16SCT
Phone Line Isolation
Telephone Service to Substation


WAN
HST
RTU
16ERFCM
16ESM
11-1
11-2
11-3
11-4
Ethernet Link


SCADA/EMS
Operations on Control WAN
Information Users on Enterprise WAN
HMI
HST
RTU
16ERFCM
16ESM A - 1
16ESM B - 1
16ESM A - 2
16ESM B - 2
11L - A
11B - A
11T - A
Monitor IED A
11L - B
11B - B
11T - B
Monitor IED B
System A Redundant Relays
Ethernet Optical Fiber Pairs
System B Redundant Relays

Explanation of the “List Box” Method

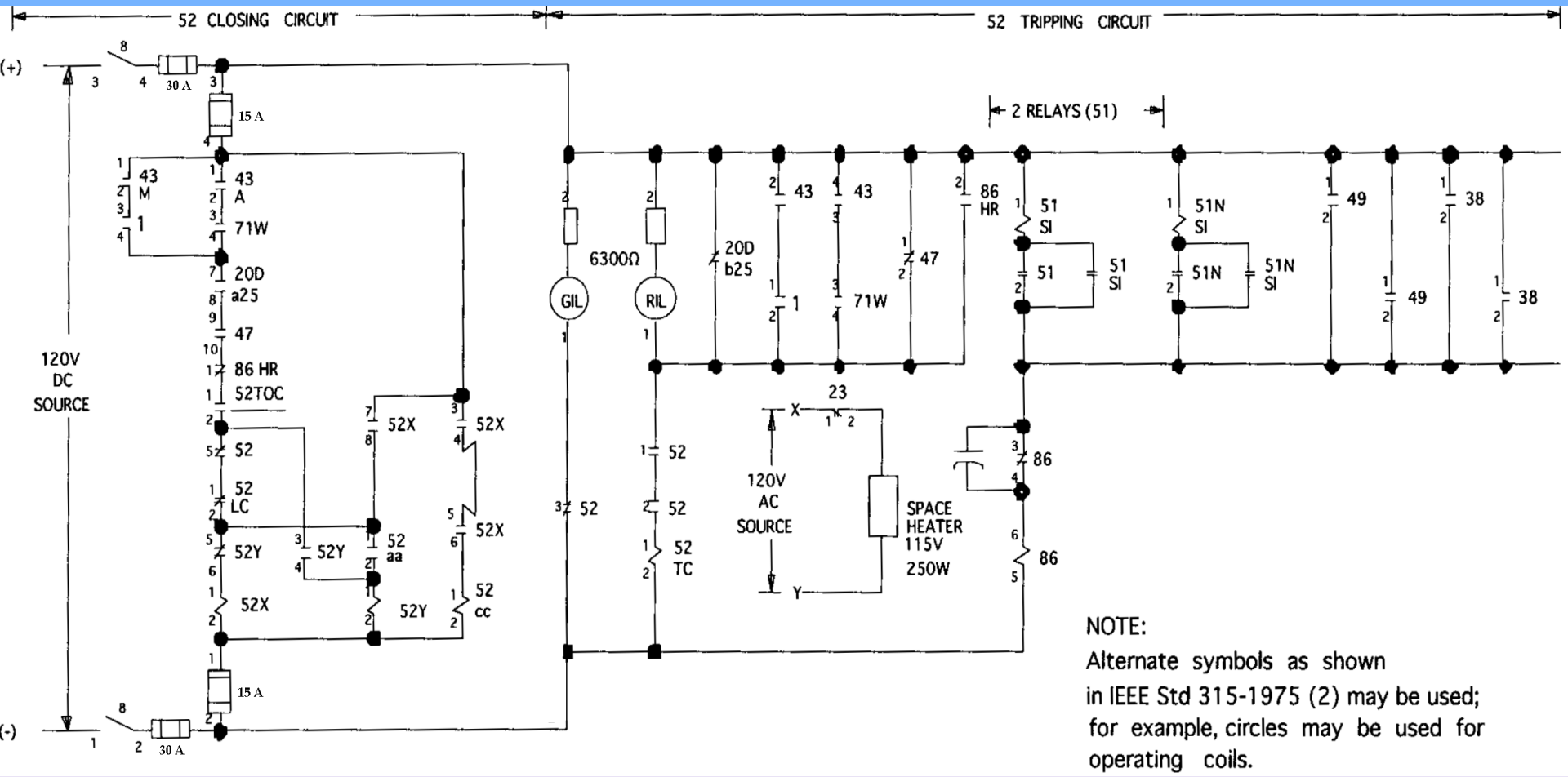
- The zone of protection covered by this multifunction device 11 is Line 1209. The line is connected to a breaker-and-a-half substation via bus breaker 108 and mid breaker 118. This device is the System A multifunction device for line 1209. There is also a System B multifunction device 11 on line 1209 as well, and would have its own “list box”.
- Shown are the major functions provided in this device for the protection, monitoring, and control of line 1209 and its associated breakers. It also shows how remote SCADA and local control is implemented in which devices (to maintain redundancy). Note that automatic reclosing (device 79) is implemented on a per line basis and not on a per breaker basis (otherwise it would have been listed as 79-108 and 79-118). The reclosing function is not redundant and thus does not have an A or B suffix. To maintain redundancy for the various close control functions, synch check (device 25) is redundant (it does have an A or B suffix). The binary I/O and communications connections (arrows on the right side of the box) are optional, and may be implied (not shown) to reduce the complexity of the diagram.
- Mid breaker 118 may also have a similar multifunction device 11 associated with the adjacent zone. It is important to know if common functions such as manual control, automatic reclosing, and breaker failure for breaker 118 also reside in that device. This is readily apparent using the list box method.

Example from cross reference table (3 pages long in C37.2 Annex)

Functionality	IEEE C37.2 Reference	Modeled in IEC 61850-7-4
Checking or interlocking relay	3	CILO
Zero speed and underspeed	14	PZSU
Ethernet Router	16ER	
Volts per Hz	24	PVPH
Synchronism-check	25	RSYN

Added diagram

Coordinated trip and close fusing (from PSRC WG report)



Many Technical Committees on the Invitation to Ballot

- PES Substations Committee
- PES Power System Relaying Committee
- PES Power System Communications Committee
- IAS Power System Protection Committee
- IAS Rural Electric Power Committee
- IEEE Rail Traction Standards Subcommittee

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