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GE Multlin's New Peer-to-Peer Relay Communication Mechanism Saves Customers Time And Money on Protective Relaying Applications

New mechanism for direct high-speed peer-to-peer relay communications facilitates customer relaying applications across the Universal Relay family of protective relays

Markham, ON, July 7, 2002 – GE Multilin announces a new high-speed peer-to-peer communications mechanism for the Universal Relay (UR) family of protective relays. The new "Direct I/O" mechanism offers a fast and reliable alternative to interfacing via output contacts or UCA GOOSE. The Direct I/O feature uses a UR digital communications card (previously applicable to the L90 only), which can be easily ordered as a plug-in module.

Drew Baigent, Senior UR Communications Specialist for GE Multilin, explains, "The new Direct I/O feature allows the UR devices to exchange on/off states via digital communications cards connected directly in an open ring, ring or dual ring configurations. The mechanism is similar to a token ring network, where each message gets automatically forwarded to the neighboring device until it reaches the originating device. Typical applications include teleprotection, extension of I/O or programmable logic capabilities of a single UR device, distributed programmable logic, and complex schemes requiring fast and reliable communications for a considerable number of digital points."

The following are the key benefits of the new UR peer-to-peer relay communication mechanism:

- Physical interfaces include direct **fiber** (820 nm through 1550 nm, single-mode or multi-mode), **G.703 and RS422**. Certain combinations of the above interfaces are available on dual-channel cards.

- **32-bit CRC message validity check** is implemented while most relay vendors still use 16-bit CRC in their products. With 32-bit CRC the risk of accepting an invalid message under high channel noise is practically eliminated.

- Direct I/O messages **are sent immediately upon detecting a change in state** of one of the digital points configured as Direct Outputs. In addition, periodically a scheduled transmission takes place in order to validate integrity of the

communications channels. If such a periodic message is not received within a pre-defined period of time, a self-test alarm flag is set allowing the user to re-configure the relay accordingly. In a ring configuration the originating relay should see its own message being returned within a short period of time. If such a message is not returned, a self-test alarm flag is set signaling a broken ring.

- In case of lost communications the Direct Inputs are set to **user-selected default values**. This allows biasing the schemes as per intended application.

- User configuration mechanism for the Direct I/Os is identical with the existing UR settings for Remote I/Os (UCA GOOSE). **This reduces the learning curve and speeds up user applications**.

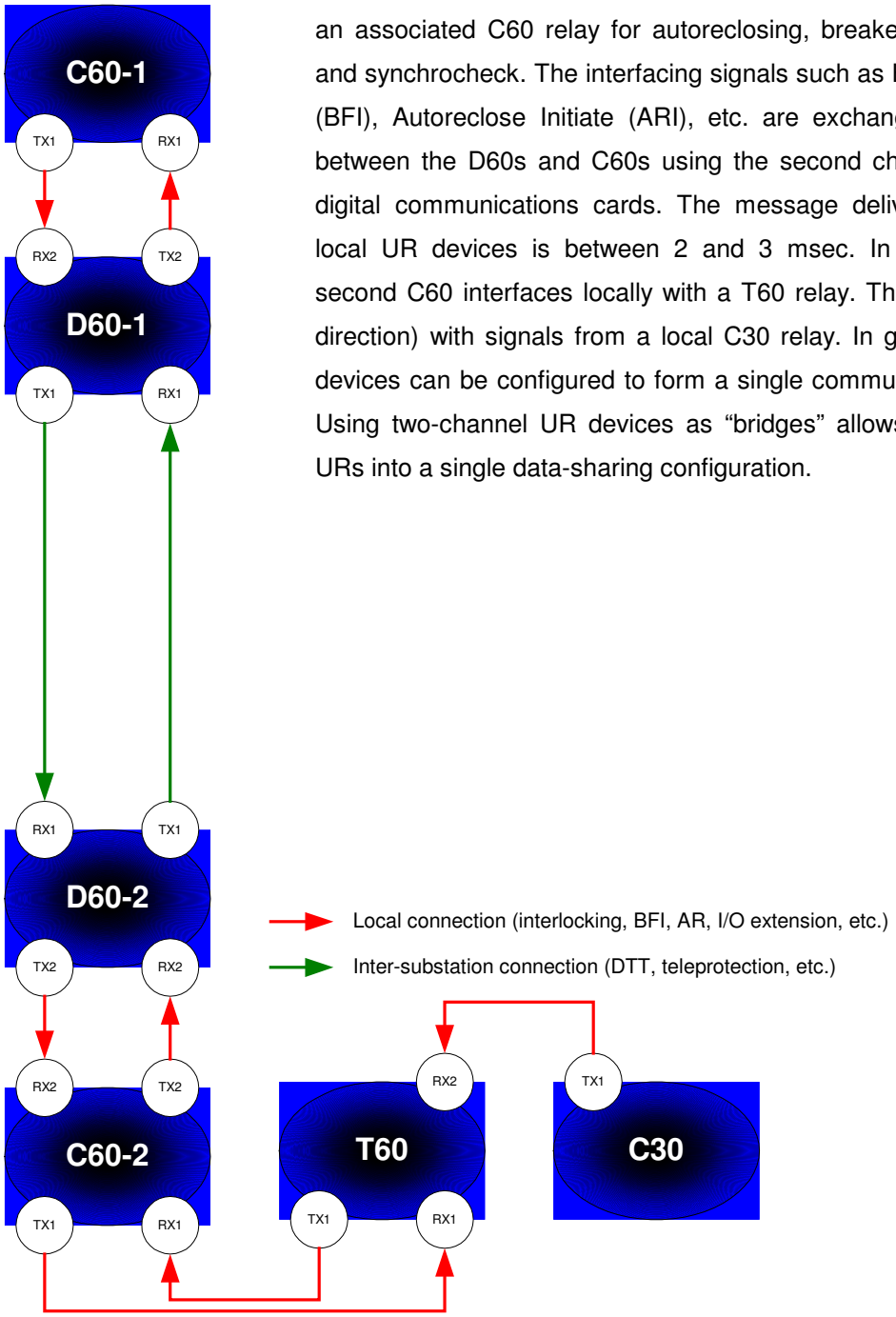
- The L90 relays could share up to **8 Digital I/Os** within a given two- or three-terminal L90 scheme. The B90 relays could share up to **96 inputs and outputs**. All the remaining URs support **32 Direct I/Os**. The B90 devices could be networked with other URs. In this case the first 32 I/O points are truly shared between the B90s and other URs.

- Direct I/O messages are delivered very fast. At 128kbps data rate it takes only **2 to 3 msec** for a Direct Output of a UR device to operate an associated Direct Input of a neighboring UR device.

- **Remote I/Os** (UCA GOOSE) **and Direct I/Os operate simultaneously and independently** (the former over Ethernet, the latter over proprietary fiber, G.703 or RS422). This multiplies digital peer-to-peer capabilities of the UR, as well as bridging various communications solutions via a “UR node”.

The figure on the next page illustrates the enormous potential and flexibility of the new communications feature.

The two D60 relays are communicating bi-directionally for Direct Transfer Tripping (DTT), teleprotection and other purposes over a utility communications network. The message delivery time in this example is between 2 and 3 msec at 128kbps plus the channel propagation time. Each of the two distance relays protecting, say, a breaker-and-a-half configuration, may be using an associated C60 relay for autoreclosing, breaker failure protection and synchrocheck. The interfacing signals such as Breaker Fail Initiate (BFI), Autoreclose Initiate (ARI), etc. are exchanged bi-directionally between the D60s and C60s using the second channel of the D60s digital communications cards. The message delivery time between local UR devices is between 2 and 3 msec. In this example, the second C60 interfaces locally with a T60 relay. The latter is fed (one direction) with signals from a local C30 relay. In general up to 8 UR devices can be configured to form a single communications structure. Using two-channel UR devices as “bridges” allows networking more URs into a single data-sharing configuration.



About GE Multilin:

GE Multilin, a division of GE Industrial Systems, is a global leader in the design, manufacture, sales and service of protection, metering, control and automation systems, as well as telecommunication networks for utility, industrial and general industry applications. For more information, visit the website at http://www.geindustrial.com/Multilin.

About the UR:

GE Multilin UR products are microprocessor-based solutions that support the open standard EPRI UCA™ MMS/Ethernet protocol. All UR products combine peer-to-peer high-speed communication capabilities with modularity, flexibility and field-programmable FlexLogic™ control for simplified substation automation. UR products include the F35 Feeder Protection Relay, the F60 Feeder Management Relay, the C30 Controller, the L90 Line Differential Relay, the C60 Breaker Management Relay, the T60 Transformer Management Relay, the T35 Transformer Management Relay, the L60 Phase Comparison Relay, the B30 Bus Differential Relay, the B90 Bus Differential Relay, the D60 Line Distance Relay, the G60 Generator Management Relay, and the M60 Motor Management Relay.

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