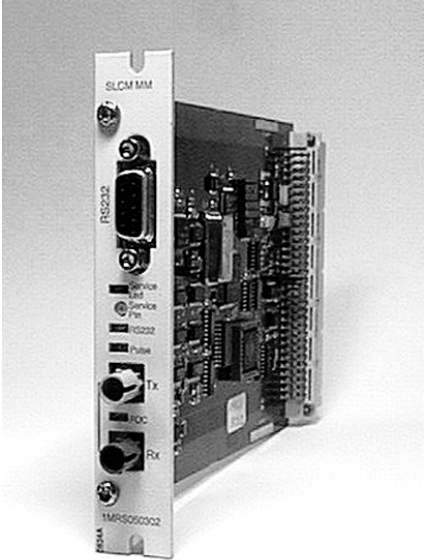


Option card for LON[®] Star Coupler RER 111

SLCM

Product Guide



Features

- Five different methods to synchronize LON® devices including Very Accurate Time Sync methods (VATS)
- RS232 interface to clock reference device
- Pulse input for second or minute pulse from clock reference device
- RER 111 (LON® Star Coupler) option card
- RER 111 provides connection to the LONWORKS network
- Configurable functions
- LEDs indicating proper communication operation and device status
- Self-supervision

Application

The LON® Clock Master SLCM is basically designed to be used as a part of a distribution automation system with LONWORKS data communication. The SLCM is a RER 111 compatible option card and connection on LONWORKS network is provided by other RER 111 option cards.

The SLCM option card, when integrated within the RER 111 unit, provides a connection from a clock reference device to the LONWORKS network.

The SLCM option card includes an internal clock and an application program. The program uses the internal clock to generate various kinds of synchronization messages and signals in order to synchronize other devices on the LONWORKS network.

According to the configuration, the internal real time clock is adjusted and one or more of five synchronization methods are sequentially accomplished. Configuration can be set via LON.

Design

Basic synchronization operation

The SLCM uses the following synchronization methods:

- SNVT_time_stamp
- NV_clock_warning & NV_clock

- NV_time
- VATS pulse based
- VATS with bit pattern detection

Accuracy in time synchronization is achieved by adding special hardware structures to the basic LON node.

Table 1: Accuracy for different methods

Method	Accuracy
SNVT_time_stamp	100 ms
NV_time	100 ms
NV_clock_warning & NV_clock	5 ms
VATS with bit pattern detection	100 μs
VATS pulse based	100 μs

Clock reference devices

The SLCM utilizes pulse outputs and RS232 data from the clock reference device. The RS232 is a 3-wire connected interface with 4800 b/s data rate. Following ASCII based protocols are implemented:

- Trimble ASCII Interface protocol (TAIP)
- Meinberg Standard Time String

The SLCM card requests reference time from the clock reference device when a proper synchronization mode is set and after that once in a minute.

GPS device compatibility is tested for Meinberg 167 and Trimble SV6 devices.

Network variables

Desired synchronization method and clock reference device can be selected by network variable `nv_sync_mode`. In case of clock reference failure, the network variable `nv_invalid_ref` is activated and information on the invalid status of the synchronization is distributed over the network. Reference time can also be updated via LON using `nv_ref_time` network variable. Valid time zone can be set by network variable `nv_time_zone`. All the network variable values can be read and modified using LON network tool.

System configuration

The most conventional system with one clock: reference device is shown in figure 1.

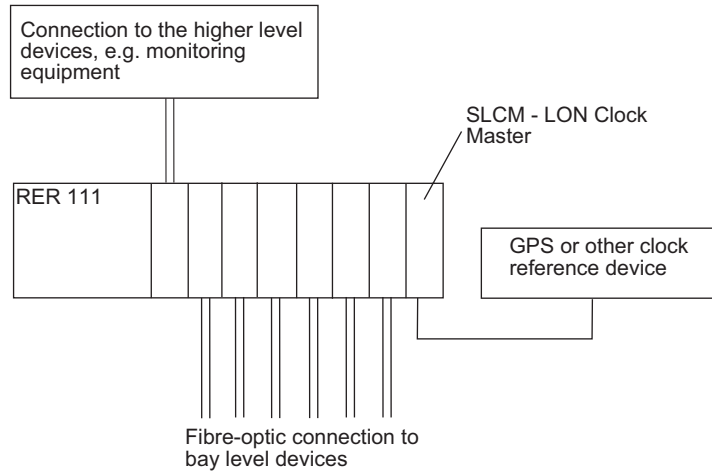


Fig. 1 System structure. SLCM inserted in LON[®] Star Coupler (RER 111)

If several SLCM cards are needed in the system the reference time can be distributed from one master to another in a network variable `nv_master_time`. This way long RS232 connections can be avoided. Pulse signal is always required for all SLCMs in a system.

Communication interface

The RER 111 provides connection to the LONWORKS network with different communication medium. SLCM has also a pair of fibre-optic transceivers on the front panel that can be used to connect SLCM to the LONWORKS network. The SLCM motherboard connection to the RER 111 unit can be disconnected when only the fibre-optic interface is required. Communication speed can be selected 1.25Mb/s or 78kb/s.

Technical data

Table 2: I/O

Serial	RS232, 3-wire
Pulses	TTL

Table 3: Environmental conditions

Specified service temperature range	-10°C...+55°C
Transport and storage temperature	-40°C...+70°C
Dry cold test (according to IEC 60068-2-1)	-10°C
Dry heat test cyclic (according to IEC 60068-2-2)	+55°C
Damp heat test cyclic (according to IEC 60068-2-30)	+25...55°C, RH > 93%
Storage temperature tests (according to IEC 60068-2-48 (IEC 60068-2-8))	-40°C...+70°C

Table 4: Standard tests

Insulation tests	Dielectric test (IEC 60255-5)	Test voltage	2.0 kV, 50 Hz, 1 min.
	Impulse voltage test (IEC 60255-5)	Test voltage	5 kV, 1.2/50µs, 0.5 J
	Insulation resistance measurements (IEC 60255-5)	Insulation resistance	>100MΩ, 500 V dc

Table 5: Electromagnetic compatibility tests

1 MHz burst disturbance test (IEC 60255-22-1)	common mode	2.5 kV
	differential mode	1.0 kV
Electrostatic discharge test (IEC 60255-22-2 and IEC 61000-4-2)	for contact discharge	6 kV
	for air discharge	8 kV
Radio frequency interference test	radiated, amplitude-modulated (IEC 61000-4-3)	10 V/m (rms) f = 30...1000 MHz
	radiated, pulse-modulated (EN 50140)	10 V/m, f = 900 MHz f = 1.89 GHz
	radiated, test with a portable transmitter (IEC 60255-22-3, method C)	f = 77.2 MHz, P = 6 W f = 172.25 MHz, P = 5 W
Fast (5/50 ns) transient disturbance test (IEC 60255-22-4 and IEC 61000-4-4)	RER 111 power supply	4 kV, class 4
Surge immunity test (IEC 61000-4-5)	RER 111 power supply	4 kV, common mode 2 kV, differential mode
Electromagnetic emission tests	conducted RF emission (mains terminal)	EN 55011, class A
	radiated RF emission	EN 55011, class A

Block diagram

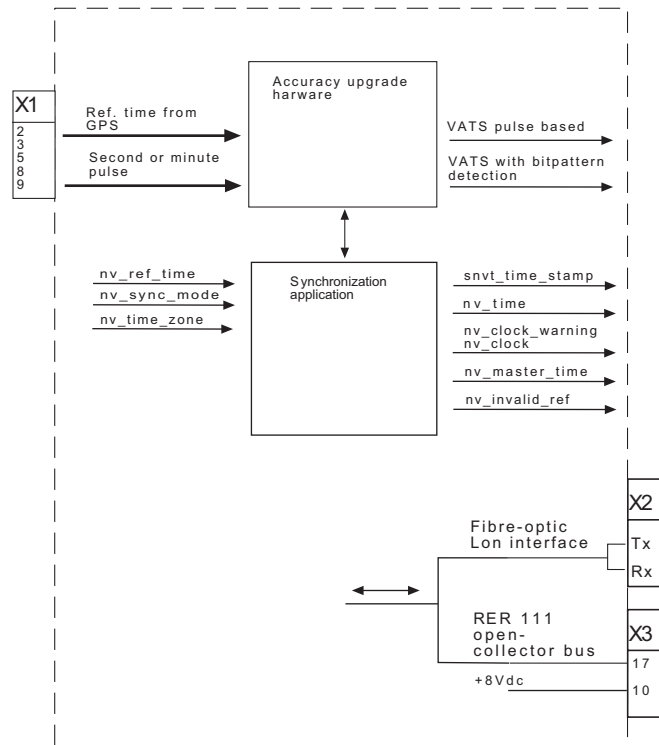


Fig. 2 Block diagram

Ordering

When ordering, please specify:

Ordering information	Ordering example
1. Type of the fibre-optic transceiver	SLCM MM, 1MRS 050302
2. The quantity required	5 pieces

Order numbers

SLCM MM, ST type fibre-optic transceiver	1MRS 050302
SLCM BB, snap-in-type plastic fibre-optic transceiver	1MRS 050303
SLCM SS, SMA type plastic fibre-optic transceiver	1MRS 050304

References

Additional information

RER 111 LON® Star Coupler User's Manual and Technical description	1MRS 750104-MUM
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ABB Oy

Distribution Automation

P.O. Box 699

FI-65101 Vaasa, FINLAND

Tel +358 10 22 11

Fax +358 10 224 1094

www.abb.com/substationautomation