Honeywell

RULA Specification and Technical Data

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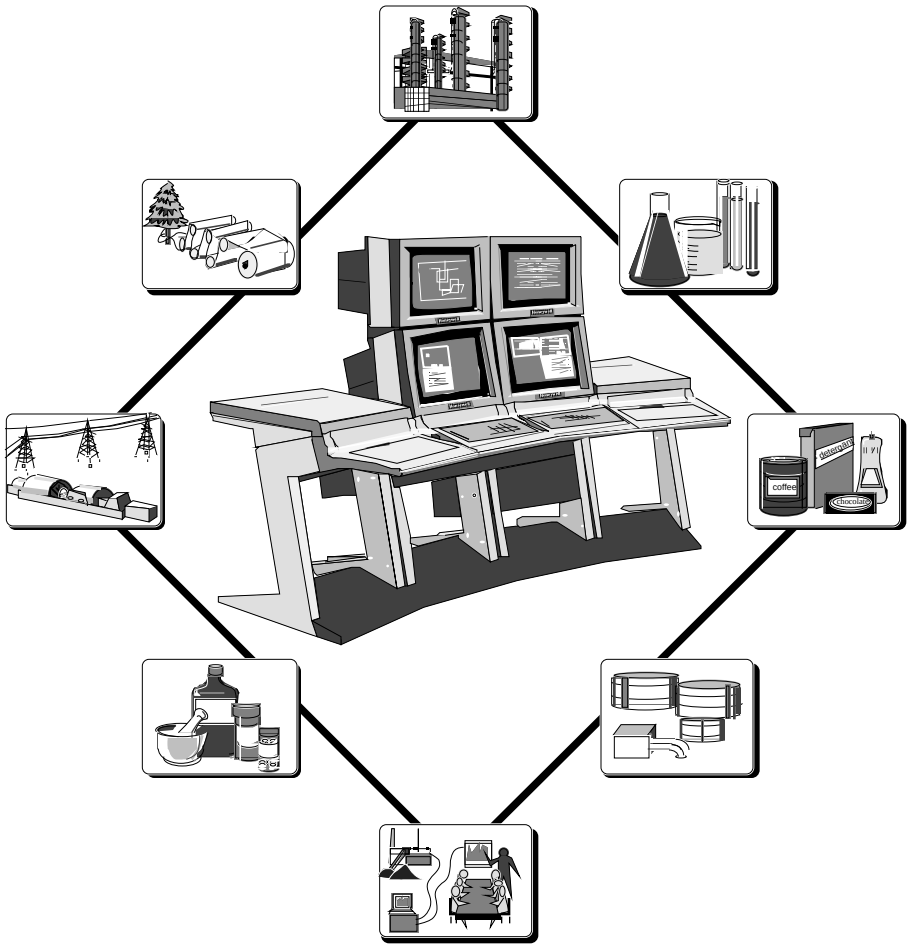

Total Plant

RULA DISCLAIMER

The performance and safety of RULA communications is directly influenced by the type of communications devices and media (modems, phone lines, bridges, routers, etc.) chosen. Additionally, third party hardware used to perform the SCSI/IEEE 802.3 conversions has been certified by Honeywell to meet the manufacturer's documented specifications. However, as with any control system, the user must follow prudent and reasonable operations and maintenance practices. As such, the following guidelines apply:

- DO NOT USE A REMOTE CONNECTION THROUGH RULA IN ANY SITUATION WHERE LOSS OF VIEW OR CONTROL FROM THE REMOTE STATION CAN CAUSE A SAFETY CONCERN OR PLANT UPSET. DO NOT ASSUME THE REMOTE STATION WILL MAINTAIN A DEPENDABLE CONNECTION TO THE HOST LCN.

- A TPS TRAINED OPERATOR IS REQUIRED TO BE IN ATTENDANCE AT BOTH HOST AND REMOTE ENDS OF THE RULA CONNECTION DURING A RULA SESSION.

- TO PROTECT AGAINST THE POSSIBILITY OF LOSS OF VIEW OF THE PROCESS, DO NOT CONNECT RULA TO EVERY STATION IN A CONSOLE.

DAYNAPORT DISCLAIMER

The DaynaPORT SCSI/Link-3 converter is a third party device used with RULA to perform the SCSI/IEEE 802.3 conversions and has been certified by Honeywell to meet the manufacturer's documented specifications. Further, it has been certified by Honeywell to provide the functionality required by RULA. However, per the manufacturer, this device has not been certified for industrial applications and consequently has not been certified by Honeywell for use in control applications. THEREFORE, THE DAYNAPORT CONVERTER SHOULD NOT BE USED IN ANY SITUATION WHERE LOSS OF VIEW OF THE PROCESS OR LOSS OF CONTROL FROM THE REMOTE SITE CAN CAUSE A SAFETY CONCERN OR PLANT UPSET.

TotalPlant Solution (TPS) System Remote User LCN Access RULA

Specification and Technical Data

Introduction

This publication describes the significant functions of the Remote User LCN Access.

Remote User LCN Access (RULA) is an optional software package that loads into a Universal Station to let users remotely access an operational **TotalPlant** Solution (TPS) System.

The fundamental concept of RULA is that a station at a remote site acts as the user interface to a distant TPS System located at the host site—as though its screen and keyboard were directly connected by cable to the system.

RULA is intended to help remote site support engineers and Honeywell TAC engineers see the same information as personnel located at the operational site, allowing:

- remote engineering,
- remote diagnostics,
- remote troubleshooting, and
- remote system administration.

Audible keyboard responses that occur when keys are pressed at the operational site are confirmed by clicks at the remote location.

User-supplied equipment for communication between a remote site and a host site includes SCSI-Ethernet converters and optional network bridges, routers, or modems, depending on the application requirements.

Figure 1 illustrates RULA hardware components using bridged communications media.

Communications can be accomplished using a wide range of interface hardware.

The pair of stations can be physically connected by a communication media such as:

- Ethernet cable,
- dedicated line,
- fiber optic, or
- intercontinental phone line.

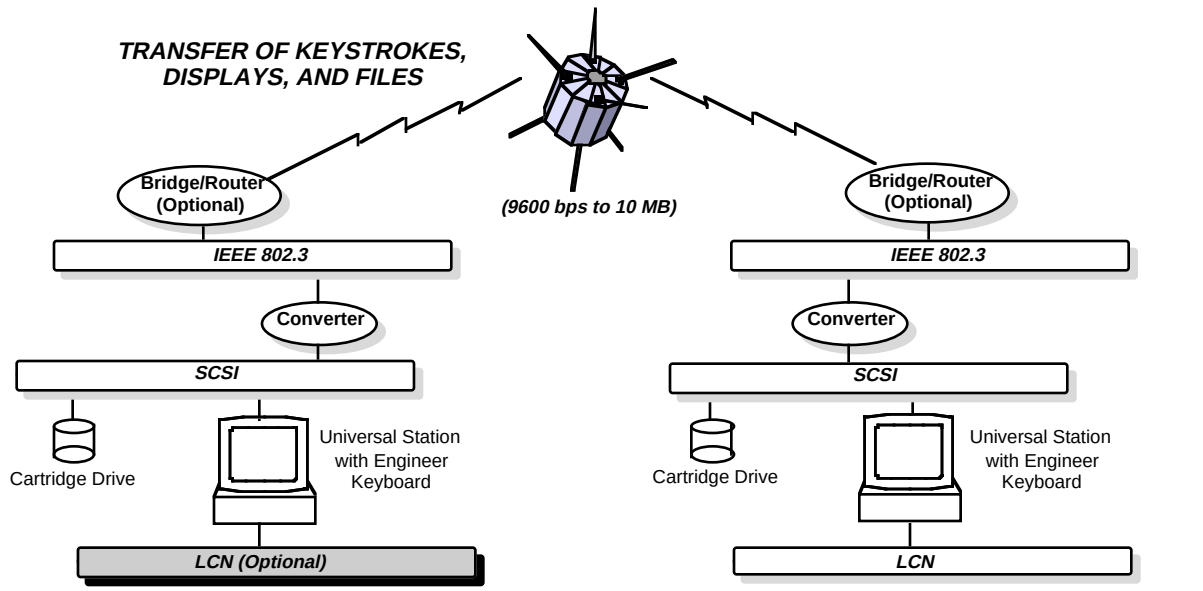

Figure 1 — RULA Architecture

Functional Description

Prior to establishing a RULA session, the user specifies which station acts as the Host and which station is the Remote:

HOST — Maintains the view of its own LCN and process.

REMOTE — Views the host LCN and host process.

Either station can be the Host in a RULA session, and as such, provide a mirror image of its display and keyboard lamps to the Remote station.

A host with X Window capability remotes only the “native” LCN window during a RULA session.

Function Summary

From a Remote site, engineers can perform all LCN engineering functions including:

- build and edit schematic source files,
- compile schematics,
- create Exception Build files,
- write and edit CL programs and text (ASCII) files,
- transfer files between host and remote HM or removable media,
- build and load points,
- view points from any operating display,
- change any point parameter, and
- invoke and operate any schematics.

From a Remote site, engineers can perform all LCN maintenance functions including:

- view and change the operational status of LCN nodes and process connected devices,
- use the System Maintenance Control Center (SMCC) displays, and
- load the database into data owners.

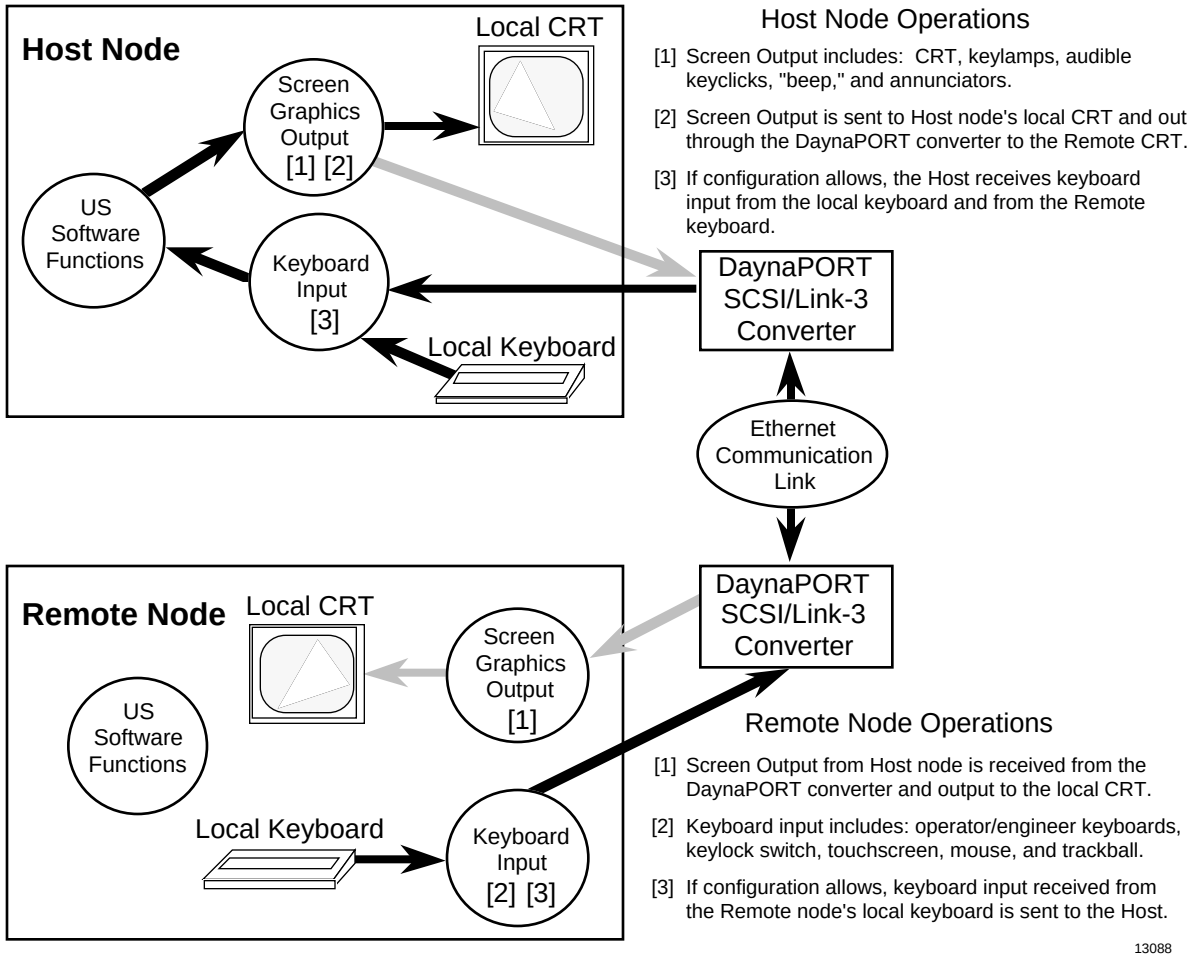

Figure 2 — RULA Concepts Overview

Inputs (keystrokes/target hits) from the remote site are transmitted to a RULA station at the host site. Software at the host site responds to inputs from the remote site as if they had been initiated locally.

The host site executes drawing commands locally and transmits them to the remote site where they are interpreted and presented on the screen.

Physical Description

LCN Components

The RULA station at each site must have an EPDG or a TPDG board, a cartridge drive, a 68020 processor, and enough memory for the Universal Personality (4 Mw min. for R4xx series, 6 Mw min. for R5xx series). A Host RULA station on an on-process LCN requires a K2LCN processor or faster (such as K4LCN on R5xx).

Additional memory may be required if other external load modules are to run in the station.

An engineering keyboard is required in order to perform a quick disconnect key sequence, and to provide complete access to engineering functions.

SCSI to Ethernet Converter

At each location, a flat ribbon cable connects the SCSI port of the EPDG/TPDG board to a third party SCSI to Ethernet converter called the DaynaPORT SCSI/Link-3. It outputs onto a standard Ethernet cable and receives on the same.

Honeywell provides kits for mounting the DaynaPORT converter. The mounting kit includes a 50 pin to 25 pin adapter cable to connect the station's SCSI bus to the converter. An Access Unit Interface (AUI) drop cable is provided to connect the AUI port of the DaynaPORT converter to a user-supplied MAU (media access unit).

Communication Equipment

The DaynaPORT converter has three Ethernet options. For RULA, the standard 15-pin AUI port should be used. Only the AUI port with thick Ethernet media is certified by Honeywell.

The AUI port connects to Ethernet media through a user-supplied MAU (transceiver), providing better electrical isolation of the DaynaPORT converter and the TDC equipment from the Ethernet media.

The type of MAU is dependent on what type of Ethernet media is used at your facility. The MAU must meet the AUI power specification of the DaynaPORT converter (250 mA maximum).

Selection of communication equipment and connection media is application and project specific. Honeywell Network Services can provide assistance in equipment selection to meet user's specific needs and to ensure compatibility with Honeywell TAC.

Bridge/Router (optional)

Any bridge or router used for RULA must be IEEE 802.3 compliant and allow proxy Address Resolution Protocol (ARP).

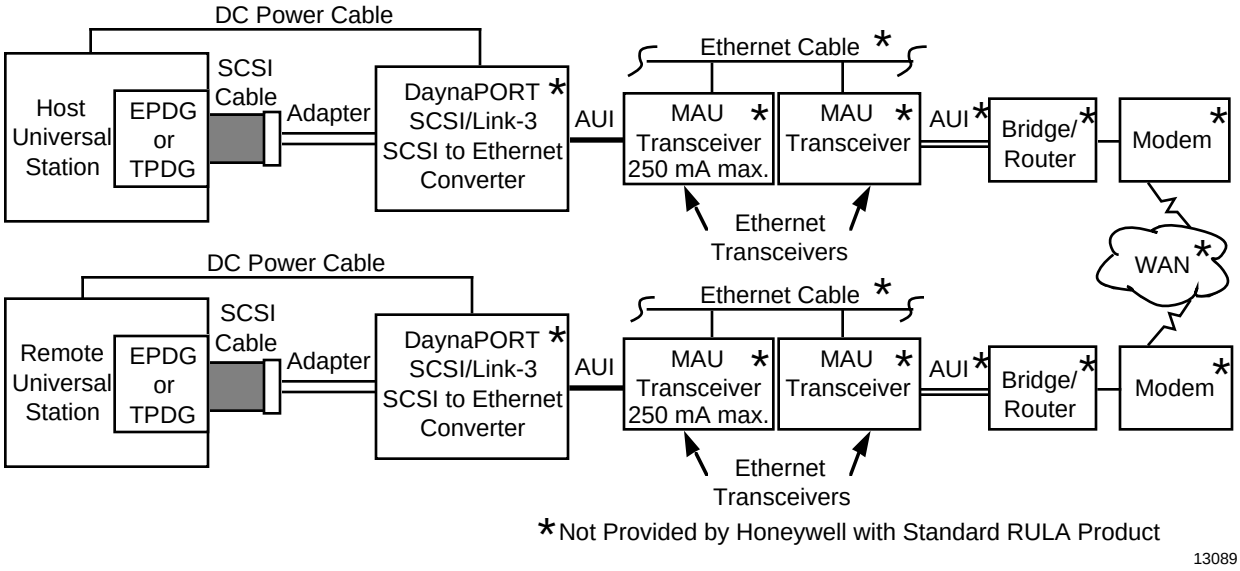

Figure 3 — Example of RULA Hardware Block Diagram

Standard Ethernet

Standard or "thick" Ethernet conforms to IEEE 802.3 10BASE-5 specifications. Two types of taps are available:

- the nonintrusive ("vampire") type requires a special tool for installation.
- an intrusive tap-installation requires breaking the cable.

Check with the network maintenance personnel at your facility to determine which type is preferable.

Thin Ethernet

Thin Ethernet conforms to IEEE 802.3 10BASE-2 specifications. It should be RG58-A/U cable and have a T-connector available for connection to the BNC connector on the MAU.

Twisted-Pair

Twisted-pair wiring conforms to IEEE 802.3 10BASE-T specifications.

The twisted-pair lead connects from a jack on the MAU to a network hub.

Services

Installation

Optional RULA installation service provided by Honeywell consists of installing the DaynaPORT converter, loading RULA software, making LCN configuration changes, and demonstrating RULA operation. Honeywell can also provide network installation service at additional cost.

Software Support

Honeywell's Software Enhancement and Support Program (SE&SP) provides:

- software updates and upgrades, and
- telephone-based Technical Assistance Center (TAC) support.

System Support Services

Other optional system support services from Honeywell include:

- system performance baseline, and
- on-line Technical Assistance Center (TAC) support.

An on-line TAC connection has specific configuration requirements. In order to provide a secure, high performance on-line TAC connection, dedicated communications equipment is required. A customer site must meet specific configuration requirements for an on-line TAC connection (see Figure 6).

Non-standard configurations may be certified on a project basis. This optional service is available from Honeywell at additional cost. If you have further questions about an on-line TAC connection, ask your Honeywell representative for assistance.

Network Services

Honeywell's network services include:

- network baseline,
- network design,
- network installation,
- network monitoring, and
- network integration.

Network baseline and certification services are recommended if your network:

- has not been recently certified to be IEEE 802.3 compliant,
- involves multiple segments,
- has wide area connectors,
- uses multiple DECnet areas,
- was installed without a formal network design,
- involves bridges, routers, and/or gateways,
- has no flux budget calculation documentation for fiber runs, or
- has other unchecked design factors that may prohibit effective communication between endpoints.

Such services make RULA support more effective and increase network reliability and performance. In any case, the cabling must be certified to meet or exceed the applicable IEEE 802.3 specifications. Cable certification is available from Honeywell or may be provided by your cable installer.

If you have further questions about connecting RULA to your Ethernet network, ask your Honeywell representative for assistance.

Software Requirements

RULA requires that the remote and host LCNs be running R420, or later, and that the RULA nodes be running the Universal Personality, R420 or later, with or without X Windows.

The remote and host LCNs must be running compatible software (the same first digit of the software release); for example Release R4xx series.

A non-standard display font (such as Cyrillic), defined by the International Language Support option, can be used across a RULA link, if both RULA stations contain the same font. The Honeywell International Region supplies specific character definitions for the font, the re-engraved keycaps for the engineering keyboard to identify the ILS characters, and the font cartridge for the printer.

RULA Operation

Site Selection

The Picture Editor is used to customize the RULA Site Configuration display to contain user-specific site descriptions, site IDs, and network addresses.

The user selects sites that are to participate in a RULA session, then assigns the roles of host and remote (see Node State in Figure 4).

When a RULA node is used as the *Remote*, it has no visibility of the rest of its own LCN; however, files can be sent to an HM on its own LCN, and to console drives and printers.

Access Control

Configurable access restrictions allow either site to choose security provisions that match requirements for a specific application.

This can be done at the Host or Remote site at any time as required.

The user configures these access restrictions from the RULA Control display as shown in Figure 5:

- Host Keypad/Touch Screen:

  If ENABLED, the keyboard and touchscreen of Host has the ability to input.
- Remote Keypad/Touch Screen:

  If ENABLED, the keyboard and touchscreen of Remote has the ability to input.
- Remote Alarm Ack Status:

  If ENABLED, Remote station can acknowledge alarms for Host station.
- Keylock Authority:

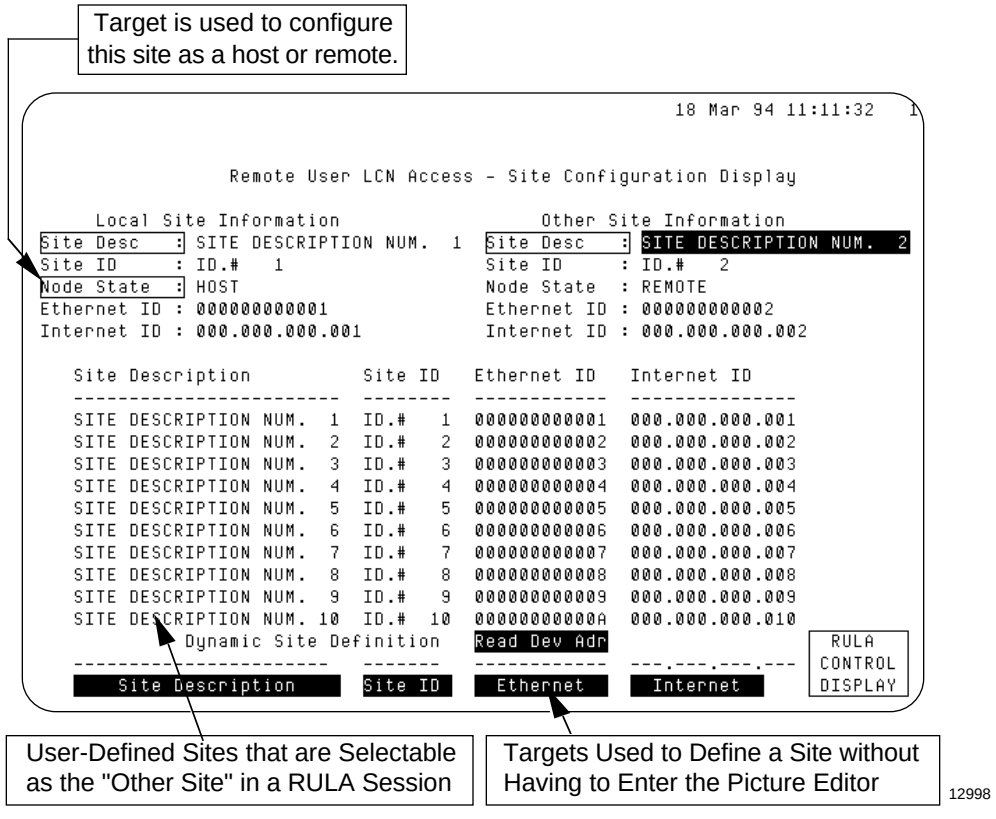

Figure 4 — RULA Site Configuration Display

Determines which station's keyswitch (Host or Remote) has control of the host station's keylock access level.

File Operations

When saving files and performing other file operations, the addition of a remote system identifier (..\) to the pathname selects the *remote* media.

To help the user perform file operations to the correct media, a screen indication (REMOTE or HOST) remains in the upper right corner of the local screen for the duration of a RULA session (see Figure 5).

Security

The levels of security provided by RULA are:

- Either site can disconnect RULA at any time.
- Either site can perform a quick disconnect by using a key sequence on the engineering keyboard.
- The logon procedure requires that someone with engineer keylock access be present at both locations and participate in the logon.
- Users can disable keyboard and touchscreen input from either station through configurable restrictions.
- If either station goes off-line, the other station is released from the RULA connection, and the operator can perform normal local operations.

Diagnostics

RULA provides diagnostic tools to aid in troubleshooting communication problems between two RULA stations:

- counters,
- status during connects,
- status of disconnects,
- test function, and
- real-time journal messages.

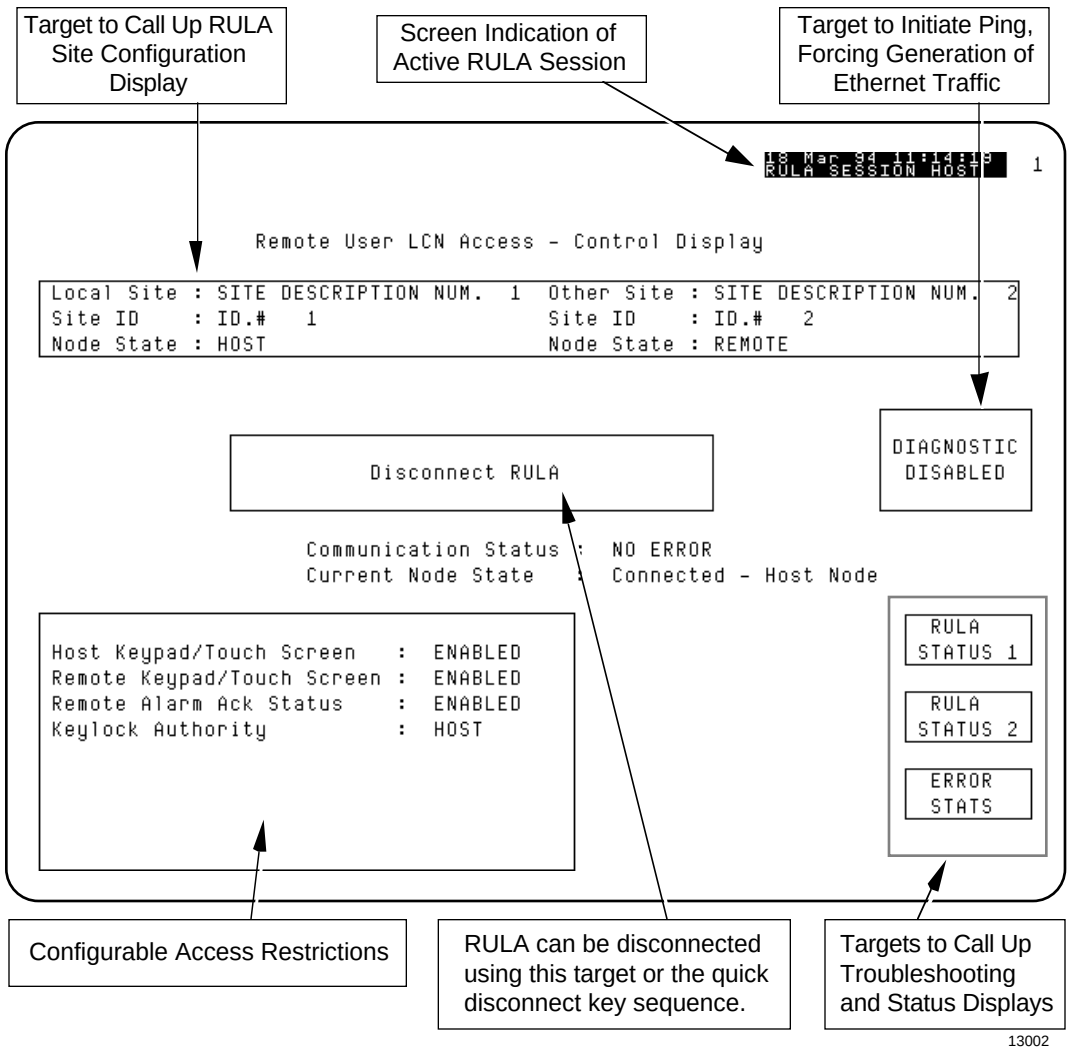

Figure 5 — RULA Control Display (as viewed from the remote site, following connection)

During a RULA session, counters display the number of bytes received and transmitted and other statistics for both sites.

During a connection attempt, statuses indicate time remaining before timeout, retries attempted, and negative responses received.

A target initiated “ping” is available to send test packets to the remote RULA station and report statistics on the results.

RULA disconnects and reasons for the disconnects are logged in the real-time journal.

RULA Performance

Schematic callup times may increase on the RULA Host and Remote stations due to several factors. These factors provide a basis for comparing the display callup times of a RULA station with those of a non-RULA station:

- user-specific interface (direct cable, bridge, router, modem, satellite, T1 leased lines, commercial phone lines, or fiber optic),
- activity on the user-specific interface,
- data transfer rate (9600 bps, 19200 bps, 56,700 bps, 10 Mbps), and
- system-specific activity on Host and Remote LCNs.

The following LCN system activities, as well as activity on the RULA node, affect RULA performance:

- node-to-node communication and interaction,
- AM control,
- node loading,
- user input processing, and
- RULA message processing.

RULA communication software uses a throttling mechanism to provide data transfer at the fastest rate possible, while maintaining a viable communication link.

In a lab setting, Honeywell engineers observed the following display callup times over a RULA link between small LCNs with low system activity (two USs, one AM, and one HM):

- 10 Mbps data rate - display call-up times increased up to three times that of a non-RULA station.
- modem at 9600 bps - display call-up times increased up to 40 times that of a non-RULA station.

Specifications

Universal Station Requirements	US, U^{X}S, UWS, or Micro TDC 3000
LCN Software	R420 (or later) Universal Personality
Processor	K2LCN or faster for on-process host, 68020 for remote and off-process host (HMPU, HPK2/3, K2LCN, or faster)
Memory	4 Mw min. for R4xx series, 6 Mw min. for R5xx series
Engineering Keyboard	Required
SCSI Peripheral Board	EPDG/EPDG I/O or TPDG/TPDG I/O
Cartridge Drive	1 required
RULA External Load Module Software	MP-RLSW01
Link speed support	9600 bps minimum (see NOTE)
Network Protocol	Internet Protocol
LAN	IEEE 802.3

NOTE: Performance of RULA communication is directly influenced by the extent, capability, and distance of the communication media chosen. Performance decreases noticeably at 9600 baud.

DaynaPORT Converter Hardware Mounting Kits

MP-RLKT01, Classic (1983) console furniture (US or U^{X}S)
MP-RLKT02, Micro TDC 3000
MP-RLKT03, Ergonomic (1993) console furniture (US or U^{X}S)
MP-RLKT04, Universal Work Station (UWS)

DaynaPORT SCSI/Link-3® Converter, Model DP0802H for 120 Vac, DP0802HS for 240 Vac

LAN Interface	10BASE-5, Transceiver (AUI) Connector–Honeywell certified with thick Ethernet
Power	External 12 Vdc 0.8 A adapter 100-130 or 210-250 Vac 50-60 Hz factory configurable 25 W maximum
AUI Power	250 mA maximum
Operating Environment	+10° to +40°C 5% to 95% RH, noncondensing
Altitude	0 to 12,000 feet
Certification	FCC Class A
Vendor	Dayna Communications, Inc. Sorenson Research Park 849 W. Levoy Drive Salt Lake City, Utah 84123-2544 (801) 269-7200 Fax: (801) 269-7363

Router (optional)

Routing Protocols	OSPF, RIP, or EGP Must be IEEE 802.3 compliant and support proxy ARP (Address Resolution Protocol)
Wide Area Network Protocol	PPP (Point-to-Point Protocol) required for TAC support, or Frame Relay (ANSI)

Honeywell Technical Assistance Center (TAC)

TAC centers worldwide use RULA and other technologies to provide optional TDC system support services. In order to provide a secure, high performance on-line TAC connection, dedicated communications equipment is required. A customer site must meet specific configuration requirements for an on-line TAC connection. A dial-up voice grade (analog) phone line suitable for 9600 baud must be available for an on-line TAC connection.

Contact your Honeywell TAC support team for the type of equipment that should be used for RULA communications with TAC, such as bridges, routers, and modems.

ATTENTION
When connected to Honeywell TAC a RULA station should be isolated to an Ethernet segment dedicated to RULA only.

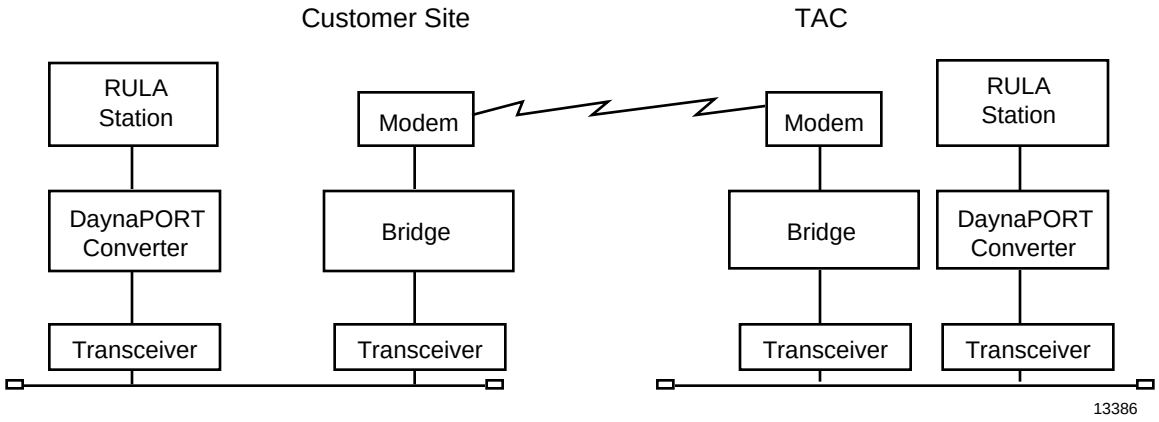

Figure 6 — Honeywell TAC Configuration Requirement

Non-standard configuration must be certified on a project basis. This optional service is available from Honeywell at additional cost. If you have further questions about an on-line TAC connection, ask your Honeywell representative for assistance.

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