# DF1 Router

## Datasheet

### A-DF1R

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CONTENTS



aparian

# 1. PREFACE

## 1.1. ABOUT THIS DOCUMENT

This document contains the technical data for the DF1 Router. The DF1 Router provides intelligent routing between EtherNet/IP and DF1 which can help simplify the migration from PLC2, PLC3, PLC5, and SLC system, particularly if they interface to non-Allen-Bradley devices.

The DF1 Router can also be used to program various Rockwell Automation controllers (ControlLogix, CompactLogx, MircoLogix, SLC, PLC5, and Mirco800) from Ethernet to Serial. This is especially useful with certain legacy controllers that do not support Ethernet as well as applications where controllers need to be accessed remotely over serial radios.

The DF1 Router can also be used to connect newer PanelView Plus and PanelView 800 devices to a range of Rockwell Automation controllers. This is especially useful with newer PanelView Plus devices (supporting only Ethernet) which needs to connect to controllers (new and old) via serial.

## 1.2. FEATURES

The DF1 Router is able to transfer data from a DF1 device to a maximum of three Logix controllers. The module operates in one of four modes, simplifying the configuration for all applications.

| Mode | Description | Message Initiator |
|---|---|---|
| Transparent PCCC | The DF1 Router will redirect DF1 PCCC messages to a Logix controller at a preconfigured EtherNet/IP path.<br>Logix PLC Mapping configuration is also required. | Remote Device |
| Reactive Tag | The DF1 Router will convert DF1 PCCC messages to Logix controller tag reads or tag writes.<br>No Logix PLC Mapping configuration is required. | Remote Device |
| Scheduled Tag | The DF1 Router transfers data between a DF1 device and a number of Logix tags, in preconfigured scheduled manner.<br>No Logix or remote device configuration is required. | DF1 Router |
| Unscheduled | The DF1 Router transfers messages received from a Logix Message instruction. | Logix (Msg) |

Table 1 - Modes of Operation

In Transparent PCCC mode the user will be able to connect and program various Rockwell Automation controllers via the serial port (from Ethernet):

- ControlLogix

- CompactLogix
- MircoLogix
- SLC
- PLC5
- Mirco800

The DF1 Router is configured using the Aparian Slate application. This program can be downloaded from www.aparian.com free of charge. Slate offers various configuration methods, including a controller tag browser.

Hereafter the DF1 Router will be referred to as the **module**.

The module can operate in both a Logix "owned" and standalone mode. With a Logix connection the input and output assemblies will provide additional diagnostics information which will be available in the Logix controller environment.

The module uses isolated RS232 for DF1 communication providing better noise immunity. The RS232 port also uses a terminal block for convenient installation. The module can also be used in systems with redundant DF1 pathways.

A built-in webserver provides detailed diagnostics of system configuration and operation, including the display of received DF1 communication packets, without the need for any additional software.

## 1.3. ARCHITECTURE

The figure below provides an example of the typical network setup.

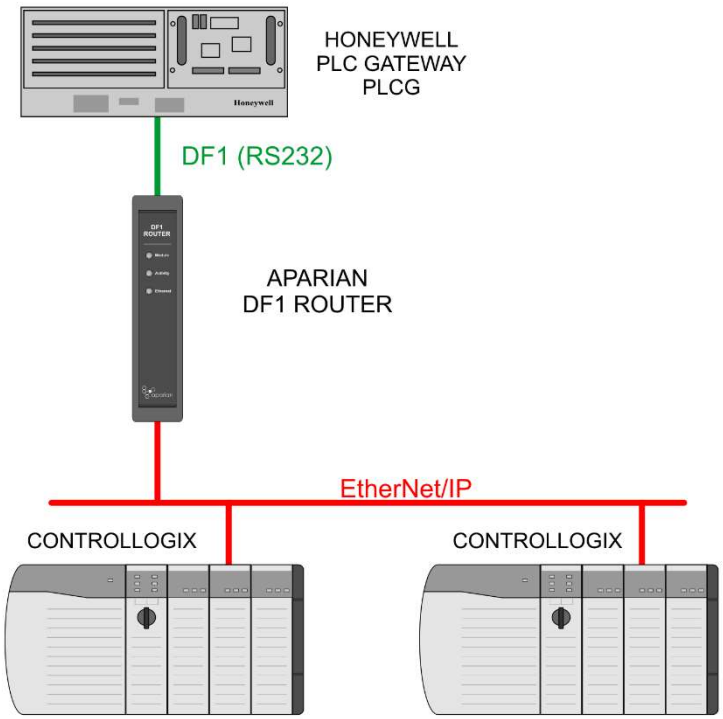


Figure 1 - Example of a typical network setup

Thus the RS232 DF1 port will be connected to the legacy device and provide an interface for data exchange with the Allen-Bradley ControlLogix or CompactLogix platforms.

When connected to devices that provide more than one DF1 port, it is possible to implement DF1 communication redundancy with the use of two DF1 Routers. These can be configured in one of two modes, either Simultaneous or Active / Standby.

In the Simultaneous mode, both modules route the same traffic to the same Logix controller. Effectively the Logix controller will receive two of each message and process both of them.
To achieve an Active / Standby mode, one of the modules has its routing capability disabled, achieved by setting the Inhibit Routing bit in the output assembly. Logic in the Logix controller can monitor the connection and performance of the Active module, and if necessary and inhibit the Active module and un-inhibit the Standby module.

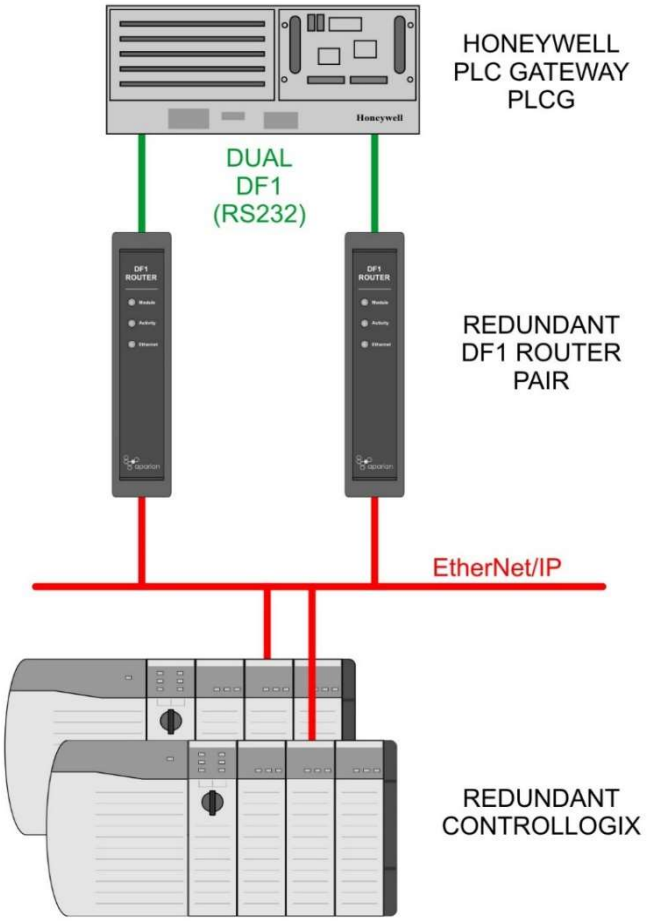


Figure 2 - Redundant Architecture

The DF1 Router can be used in redundant Logix controller systems.

Systems that rely on a central ControlLogix communicating to a number of remote DF1 devices, e.g. MicroLogix and SLC stations, may find the DF1 Router useful when upgrading to a newer ControlLogix processors, as the latter no longer supports a serial port. These systems can easily be upgraded using the DF1 Router without affecting the existing and often costly wireless infrastructure.

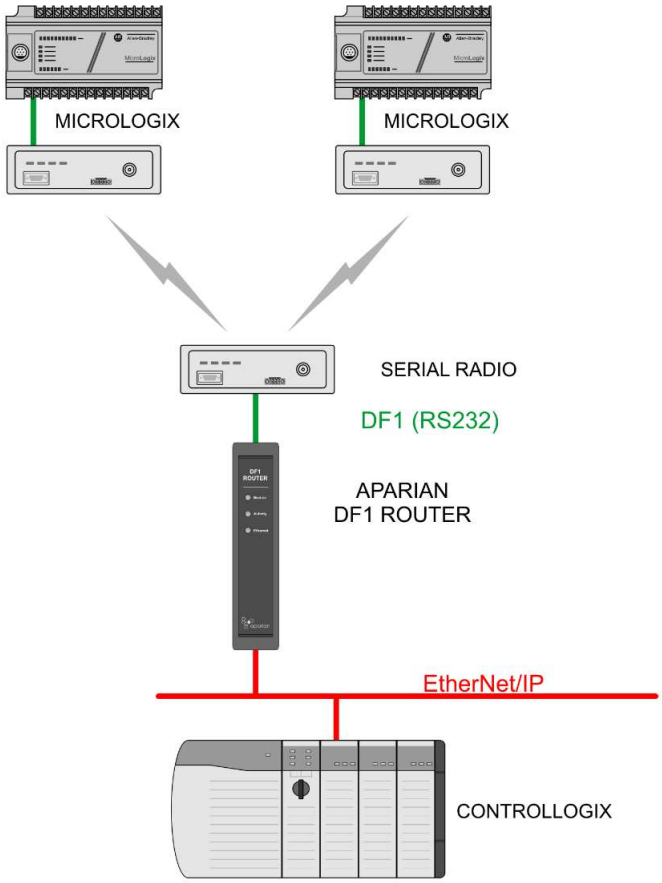


Figure 3 - Remote MicroLogix System

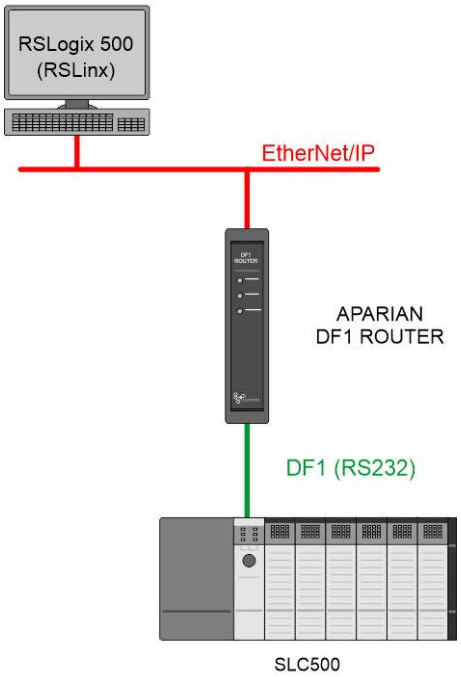


Figure 4 - Example of programming a contoller (eg. SLC)

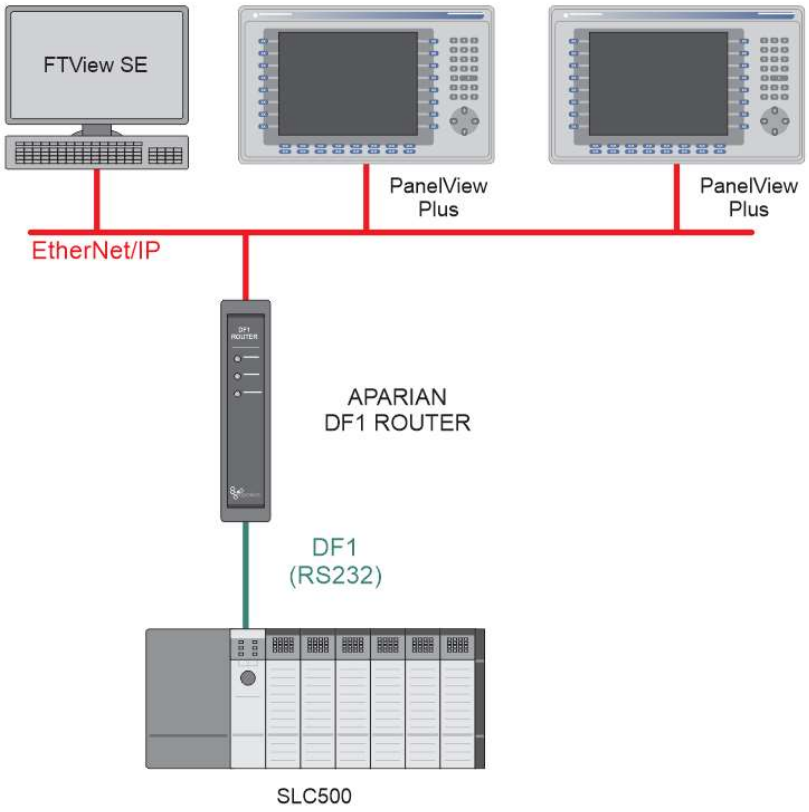


Figure 5 - Example of connection Ethernet-Only PanelView Plus devices to a controller (SLC)

# 2. ETHERNET/IP NETWORK

| Specification | Rating |
|---|---|
| Connector | RJ45 |
| Conductors | CAT5 STP/UTP |
| ARP connections | Max 20 |
| TCP connections | Max 20 |
| CIP connections | Max 10 |
| Communication rate | 10/100Mbps |
| Duplex mode | Full / Half |
| Auto-MDIX support | Yes |

Table 2 - Ethernet specification

# 3. DF1 NETWORK

| Specification | Rating |
|---|---|
| Connector | 4-way terminal |
| Conductor | 24 – 18 AWG |
| Isolation voltage | 2.5 kV |
| Protocol | DF1 Full Duplex, DF1 Half Duplex, DF1 Radio Modem |
| BAUD | 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 |
| Parity | None, Even, Odd |
| Data bits | 8 |
| Stop bits | 1 |
| Error detection | CRC, BCC |
| Embedded response | Auto, On |
| Transparent mode mapping | Max 20 routes |
| Logix Tag mode mapping | Max 20 routes |
| Reactive Tag Mode Message Support | PLC-5 Typed Read, PLC-5 Typed Write, SLC Typed Read, SLC Typed Write, PLC-2 Unprotected Read, PLC-2 Unprotected Write, PLC-2 Unprotected Bit Write |
| Scheduled Tag Mode Message Support | PLC-5 Typed Read, PLC-5 Typed Write, SLC Typed Read, SLC Typed Write |

| | |
|---|---|
| Rockwell Automation Controller programming support | ControlLogix, CompactLogix, MircoLogix, SLC, PLC5, Mirco800 |

Table 3 - DF1 specification

# 4. ELECTRICAL SPECIFICATIONS

| Specification | Rating |
|---|---|
| Power requirements | Input: 10 – 28V DC, (70 mA @ 24 VDC / 130 mA @ 10 VDC) |
| Power consumption | 1.7 W |
| Connector | 3-way terminal |
| Conductors | 24 – 18 AWG |
| Enclosure rating | IP20, NEMA/UL Open Type |
| Temperature | -20 – 70 °C |
| Earth connection | Yes, terminal based |
| Emissions | IEC61000-6-4 |
| ESD Immunity | EN 61000-4-2 |
| Radiated RF Immunity | IEC 61000-4-3 |
| EFT/B Immunity | EFT: IEC 61000-4-4 |
| Surge Immunity | Surge: IEC 61000-4-5 |
| Conducted RF Immunity | IEC 61000-4-6 |

Table 4 - Electrical specification

# 5. CERTIFICATIONS

| Certification | Mark |
|---|---|
| CE Mark | CE |
| UL Mark<br>File: E494895 | c UL us LISTED<br>CLASS 1, DIV 2, GROUPS A, B, C, D |

| | |
|---|---|
| ODVA Conformance | EtherNet/IP™<br>* F/W 1.014 |
| RoHS2 Compliant | RoHS2 |
| RCM | |

Table 5 – Certifications

# 6. DIMENSIONS

Below are the enclosure dimensions as well as the required DIN rail dimensions.

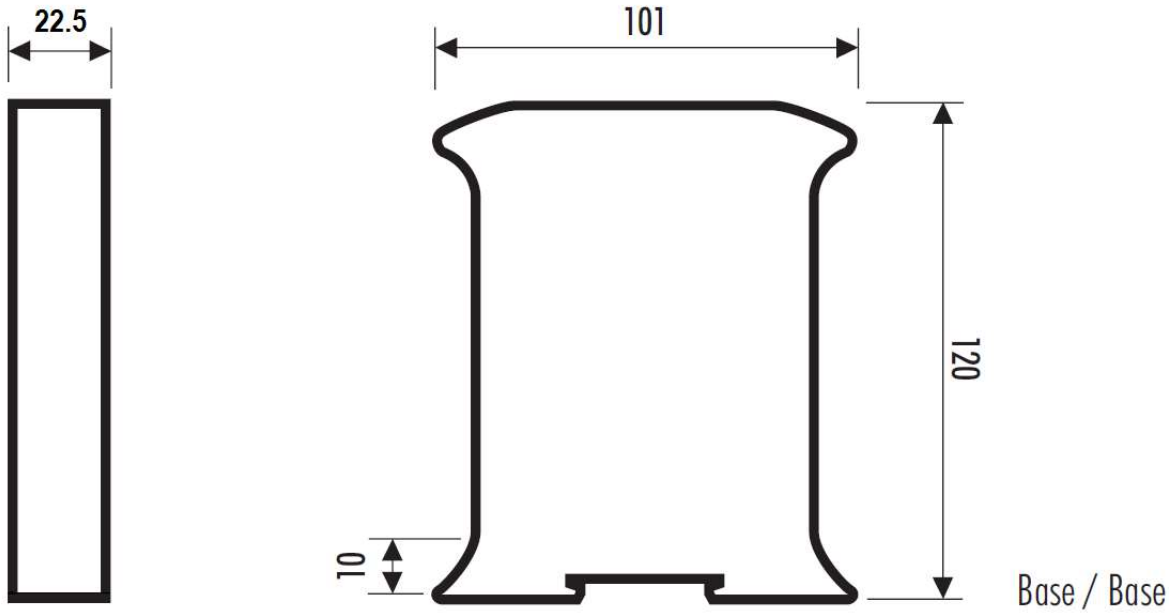


Figure 6 - DF1 Router enclosure dimensions

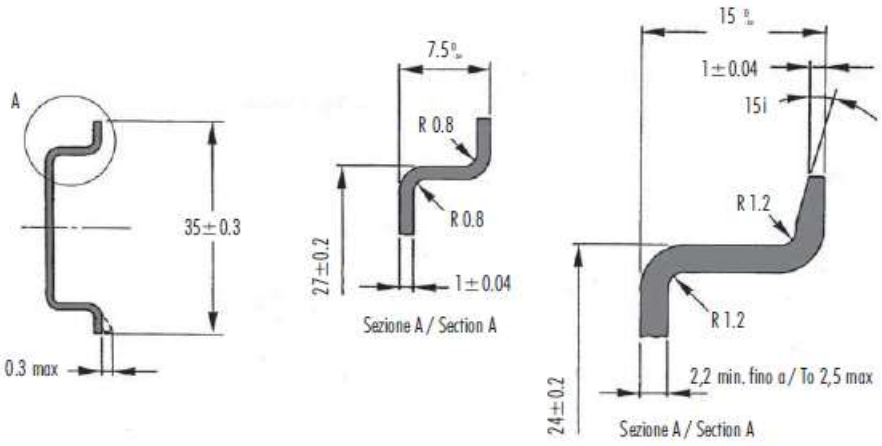


Figure 7 - Required DIN dimensions