

# IP Networking at the Event

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This document describes the IP configuration used at events, both on the fields and in the pits, potential issues and workaround configurations.

### TE.AM IP Notation

The notation TE.AM is used as part of IPs in numerous places in this document. This notation refers to splitting your four digit team number into two digit pairs for the IP address octets.

Example: 10.TE.AM.2

Team 12 - 10.0.12.2

Team 122 - 10.1.22.2

Team 1212 - 10.12.12.2

Team 3456 - 10.34.56.2

### On the Field

This section describes networking when connected to the Field Network for match play

#### DHCP (typical configuration)

The Field Network runs a DHCP server with pools for each team that will hand our addresses in the range of 10.TE.AM.20 and up with subnet masks of 255.0.0.0

- DAP1522 radio - Static 10.TE.AM.1 programmed by Kiosk
- roboRIO - DHCP 10.TE.AM.W assigned by field
- Driver Station - DHCP ("Obtain an IP address automatically") 10.TE.AM.X assigned by field
- IP camera (if used) - DHCP 10.TE.AM.Y assigned by field (note, this will not currently work with the SmartDashboard camera viewer)
- Other devices (if used) - DHCP 10.TE.AM.Z assigned by field

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## Static (workaround configuration)

It is also possible to configure static IPs on your devices to accommodate devices or software which do not support mDNS. When doing so you want to make sure to avoid addresses that will be in use when the robot is on the field network. These addresses are 10.TE.AM.1 and 10.TE.AM.4 for the DAP1522 radio and the field access point and anything 10.TE.AM.20 and up which may be assigned to a device still configured for DHCP. The roboRIO network configuration can be set from the [webdashboard](#).

- DAP1522 radio - Static 10.TE.AM.1 programmed by Kiosk
- roboRIO - Static 10.TE.AM.2 would be a reasonable choice, subnet mask of 255.255.255.0 (default)
- Driver Station - Static 10.TE.AM.5 would be a reasonable choice, **subnet mask must be 255.0.0.0**
- IP Camera (if used) - Static 10.TE.AM.11 would be a reasonable choice, subnet 255.255.255.0 should be fine
- Other devices - Static 10.TE.AM.6-.10 or .12-.19 (.11 if camera not present) subnet 255.255.255.0

## In the Pits

In the pits at the event there is no DHCP server present in the typical configuration.

## DHCP (typical configuration)

- DAP1522 radio - Static 10.TE.AM.1 programmed by Kiosk. You will not be able to communicate with the radio itself (the radio ping light in the DS will be off) but this is expected and not an issue.
- roboRIO - DHCP or Link Local, falls back to Link Local 169. address with no DHCP server
- Driver Station - DHCP ("Obtain an IP address automatically"), falls back to Link Local 169. address with no DHCP server
- IP camera (if used) - DHCP falls back to Link Local 169. address with no DHCP server (note, this will not currently work with the SmartDashboard camera viewer)
- Other devices (if used) - DHCP or Link Local falls back to Link Local 169. address with no DHCP server requires the device to support Link Local fallback and mDNS addressing (such as using the avahi service on a Linux device)

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## DHCP + DHCP Server

An alternative if one or more devices are set static but others are set DHCP is to provide a DHCP server that serves 10.TE.AM.X addresses such as an additional D-Link radio (**with the wireless turned off!!!!**) or other router. **Make sure any devices used are not broadcasting wireless signals.**

In this case the addressing will look just like the field DHCP configuration.

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## Troubleshooting

The most common issue is to have a mix of static and DHCP configured devices. This may result in things working on the field (when a DHCP server is present) but not working in the pit, when any DHCP devices fall back to Link Local addresses and cannot communicate with devices configured with a static IP.

Another issue is if the roboRIO is not powered cycled (or at least pull the ethernet cable and re-insert) after connecting to the field before trying to tether to the robot. In this case, the roboRIO still has a 10.TE.AM address (as it has had a continuous ethernet connection) and the DS computer (which has gone through an interface down and interface up cycle) will fall back to Link Local.

The last common issue is using a subnet mask of 255.255.255.0 on the DS PC. This configuration will not communicate with the FMS system which is on a 10.0.100 address.