Terminal Mode (TM) and Access Point Mode (AP)
using RS-MS3W and RS-MS3A Apps.
John M. Wysocki - ZL2TWS - November 2024

Radios tested:
ID-52A Plus (60th) using Bluetooth or data cable OPC-2480 (USB Type-A/USB Type-C)
ID-52A using data cable OPC-2418 (USB Micro-B/Micro-B) or OPC-2417 (USB Micro-B/USB Type-C)
IC-705 using WiFi or OPC-2418 data cable (USB Micro-B/USB Type-C)
ID-4100 using USB OPC-2350LU cable.
IC-9700 using USB OPC-2350LU cable.

NOTE: If you purchase the cable with the radio it will be suitable for data use. After market or third party cables are often for charging only and do not pass data.
Refer to the accompanying document: **About the DV Gateway function** for more information.

Digital devices tested:
Android Samsung phone A33 and RS-MS3A V1.41 (From Android Play Store)
Windows 7 PC and RS-MS3W V1.31 (From https://www.icomjapan.com/support/firmware_driver/3537/)
Windows 10 PC and RS-MS3W V1.31 (From https://www.icomjapan.com/support/firmware_driver/3537/)

New icom radios have a useful Terminal Mode (TM) and Access Point Mode (AP) installed in them. This mode is a more user friendly version of the Japanese Call Sign (CS) routing system.

It is easy to use and setup providing the minimum prerequisites are meet.
Menu functions vary between the radio types listed above however using this document, as your guide, should help you to navigate around your radio menu structure.

Prerequisites:
1) IPv4 Global IP address is required as used on a typical home router.
2) IPv4 router requires the following port to be forwarded: 40000 UDP. (See Page-9)
3) The port must be associated with the device connected to the IPv4 router. i.e. a PC or WiFi phone.
4) The server you want to connect to should have ports 20000, 40000, 12345 and 12346 open.
5) RS-MS3A downloaded from the App store and V1.41 or above.
6) RS-MS3W downloaded from the icom Japan web site and V1.31 or above.
7) Radio listed above with TM/AP capability and using icom specified cable.
8) Read the document **"About the DV Gateway function"** from the icom Japan web site.
9) Download the appropriate USB driver from the icom web site for use with the data cable.
10) Register a TM/AP call sign at the G3 server you registered your bass call sign.
    It is recommended that any suffix can be used except for E, G, I and S with most using A.
11) Only one device using the call sign connected to the router at one time. i.e any hotspot or
    Dongle connected using the same CS will prevent TM from working. D-Star is CS based.

RS-MS3W (TM) Installation and setup:
1) Download and install RS-MS3W from the icom Japan web site.
2) Start RS-MS3W.
3) With reference to Picture-1 below (RS-MS3W) enter details and to finish select "Apply"
4) With the USB connected, click on settings, and choose the **COM** port.
5) Enter the Gateway Repeater (Server IP/Domain) for ZL2VH enter: **123.255.47.67**
6) Enter the TM/AP call sign with the **A** suffix one space after a six letter call sign. (8th Character)
7) Enter the TM/AP call sign with the **A** suffix two spaces after a five letter call sign. (8th Character)
8) Select Gateway Type as **Global.**
9) UDP Hole punch **OFF**. **ON** if router 40000 cannot be opened for return network station only.
10) Allowed call sign is **DISABLE** as this is only used for AP mode to allow selected CS's.
11) Allowed call sign list is the CS's that you allow AP operation via your radio.
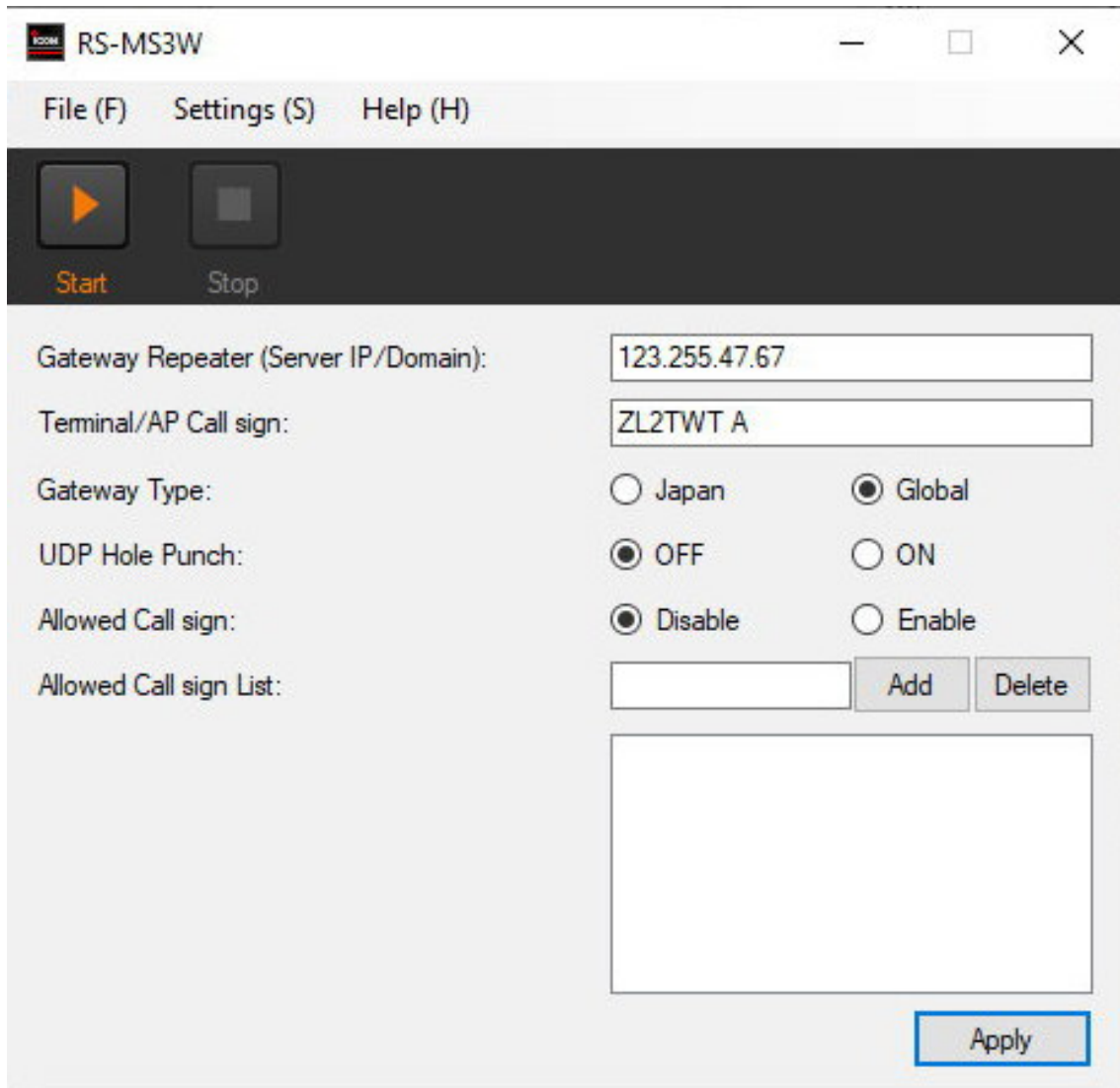
Picture-1 RS-MS3W setup entries detailed above..

In Picture-2 the **COM** port is selected from settings.
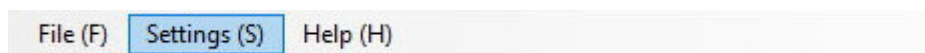
Picture-2 Click settings to enter COM port number

In Picture-3 below the **COM** port is selected from the available and known USB ports. You must first know which port is used by the radio and if not found check you have the correct driver installed. Plugging and unplugging while viewing windows device manager will help.
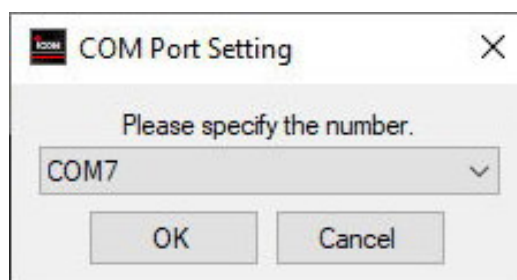

Picture-3 **COM** port selection

After **COM** is selected push the **START** button and select Terminal Mode from the **DV GW** radio menu.

If an error occurs, after 30 seconds, check the **COM** settings on the USB radio to PC.
RS-MS3W should connect to the server after **START** and time out 30 seconds later if TM is not selected in time.
When everything is correct then the Network -> Transceiver CS information will look like that shown in Picture-4 below after your first PTT. Shows as listening to the Network.
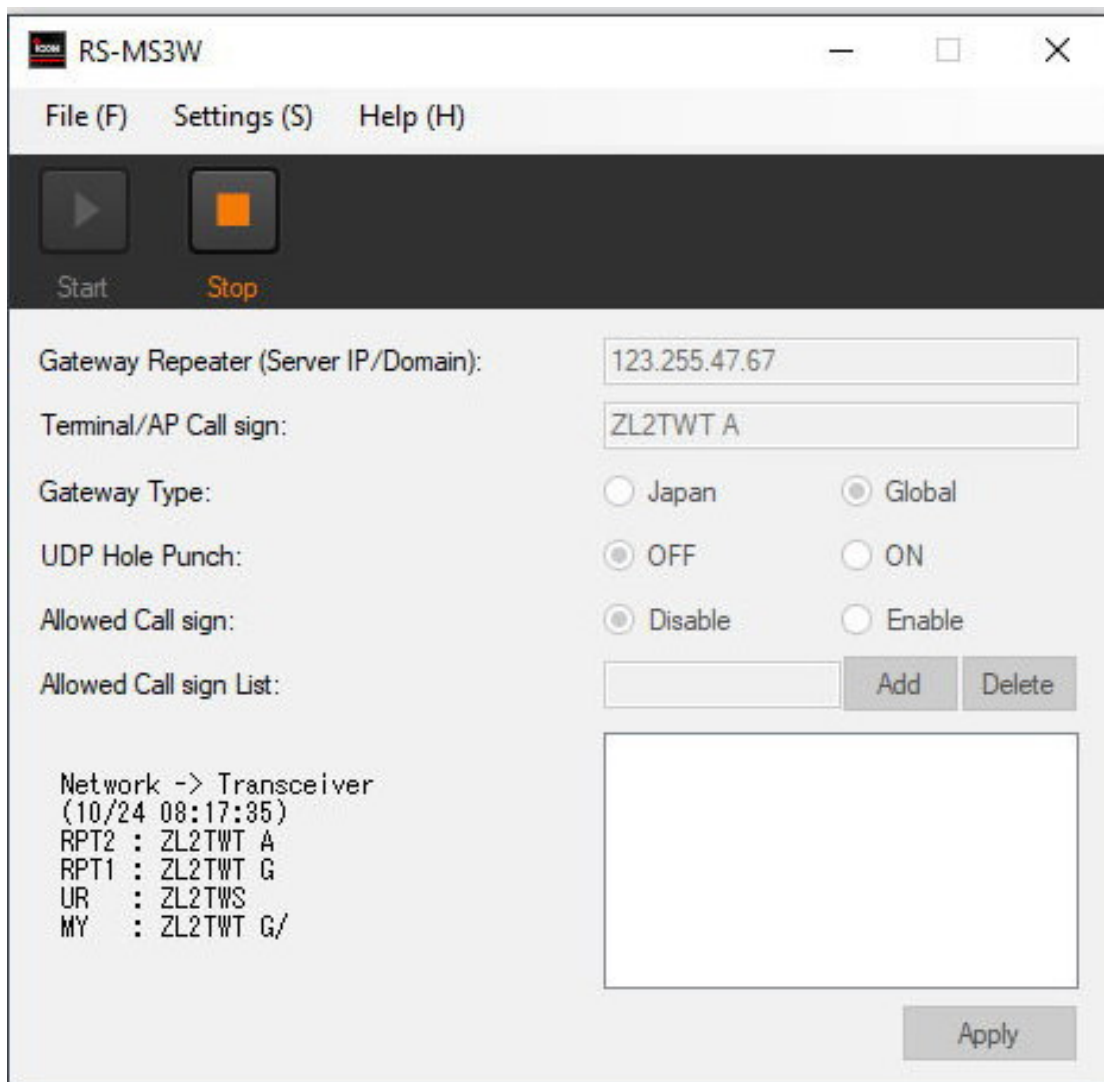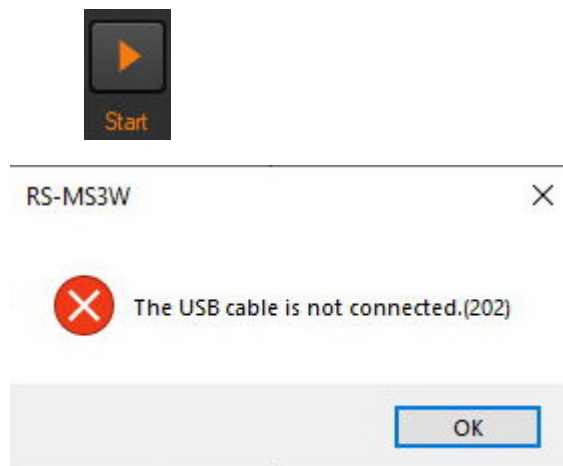
Picture-4 shows RS-MS3W connected to ZL2VH via TM ZL2TWT A

Picture-5 below shows an Oceania general call on ZL2VH C with radio PTT active. For a station to reply to a general call their radio can use RX>CS to add the received CS to their radio UR:
A Direct input (UR) can also be entered after entering on the **TO** line while in TM.
We have found that this can be unreliable until a / (slash) is placed in front of that CS.
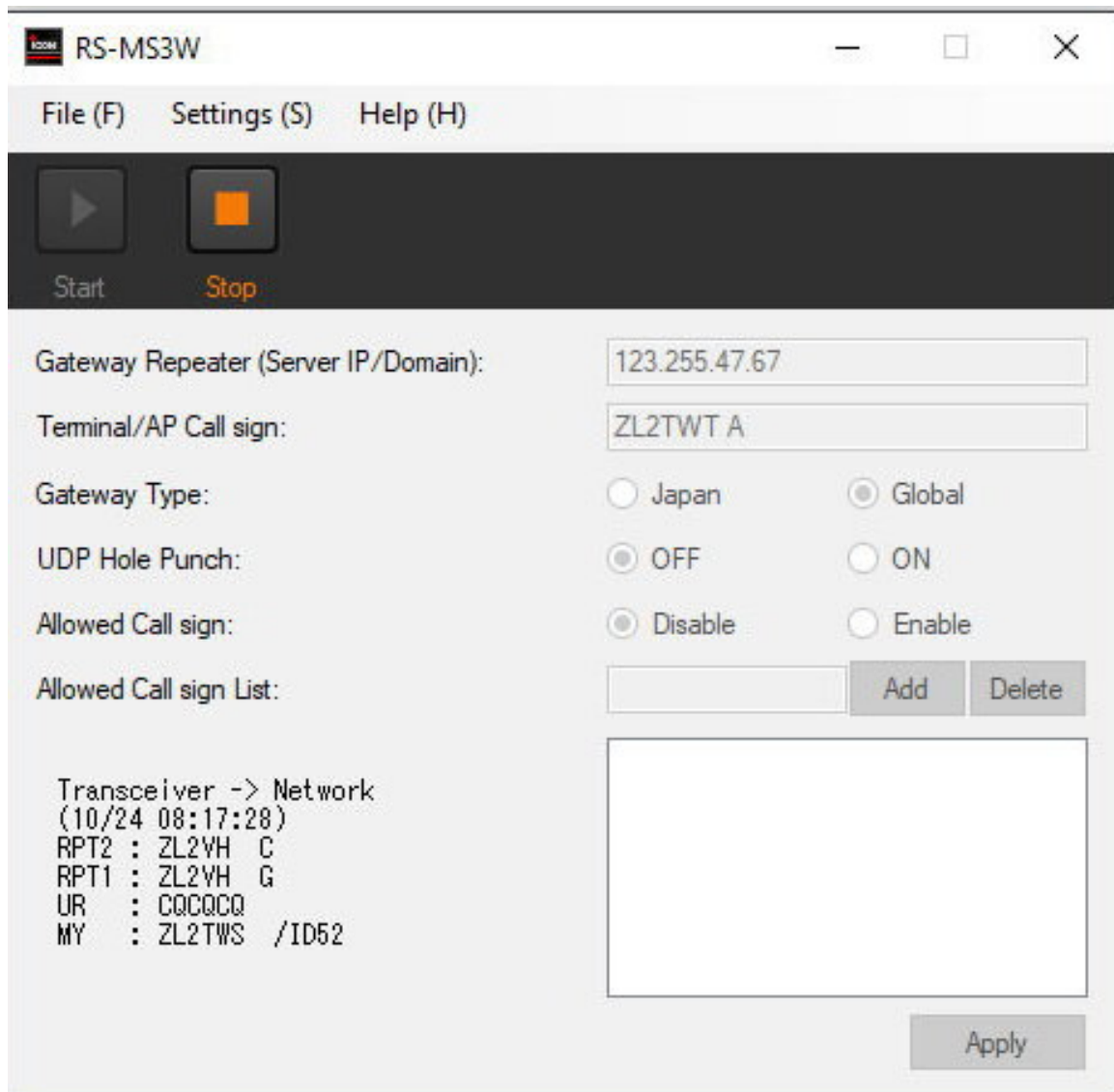
Picture-5 shows a general CQ call on ZL2VH C by ZL2TWS via the ZL2TWT A TM

This shows the CS variation that can be used, if for example, a club CS can be used as the TM with different MY: Calls entered. In this example above ZL2TWS is using the TM provided by ZL2TWT A.

ZL2JST has heard ZL2TWS call via ZL2VH C then ZL2JST must enter /ZL2TWS to his radio UR:/ZL2TWS to reply.
ZL2JST would continue to have RPT:ZL2VH C RPT:ZL2VH G and MY: ZL2JST/ID52.
ZL2TWS would then hear ZL2JST from his TM connected radio. Other listeners on ZL2VH C would be able to monitor the QSO via the 145.425 MHz RF repeater.

For the operator with one call sign available is shown in Picture-6 below.
This shows ZL2TWS via TM ZL2TWT A calling ZL2JST without a module number.
This becomes a private CS to CS via the server ZL2VH.

While in this mode of operation no traffic is heard or can be monitored and it is truly a private CS to CS QSO.
NOTE: While in TM the G3 Dashboard for ZL2VH does not show the TM CS as a remote connected user or during QSO or showing on the Last Heard listing. Only radios with RPT-Moni option show as Remote Users. See article by ZL2TWS here:
https://zl2vh.nz/assets/pdf/other/terminal-mode-access-point-mode-v1.1.pdf
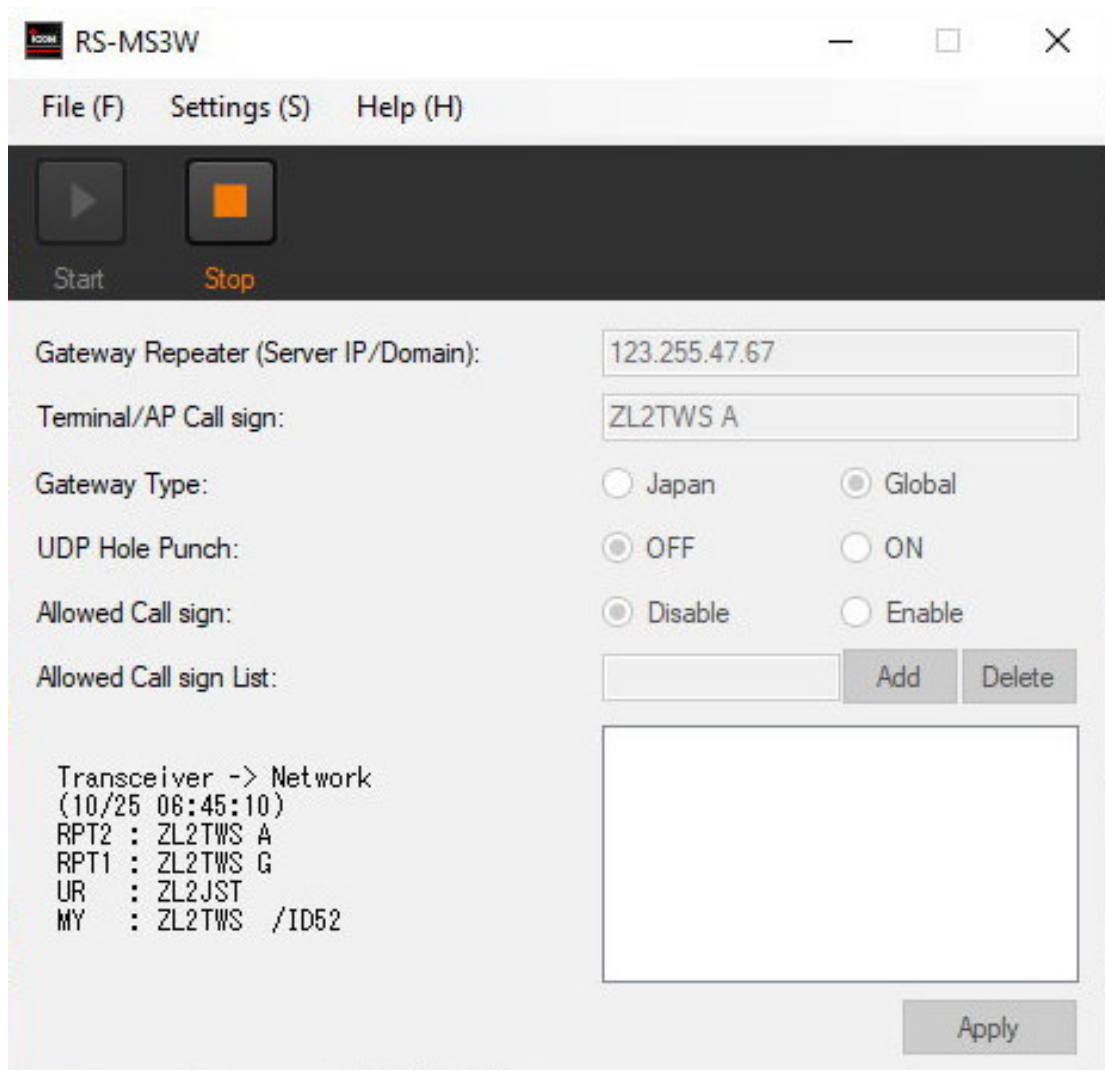
Picture-6 shows ZL2TWS via ZL2TWS A calling ZL2JST as CS>CS.

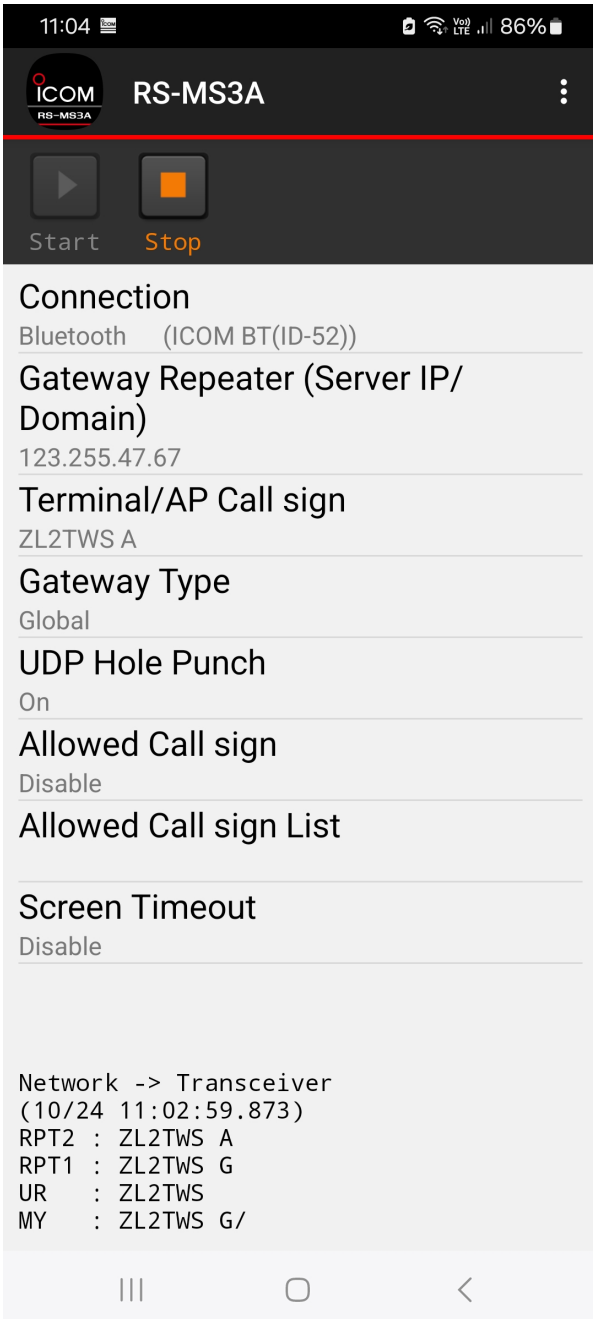ZL2JST adds UR: ZL2TWS and the QSO CS to CS is then activated via ZL2VH server.
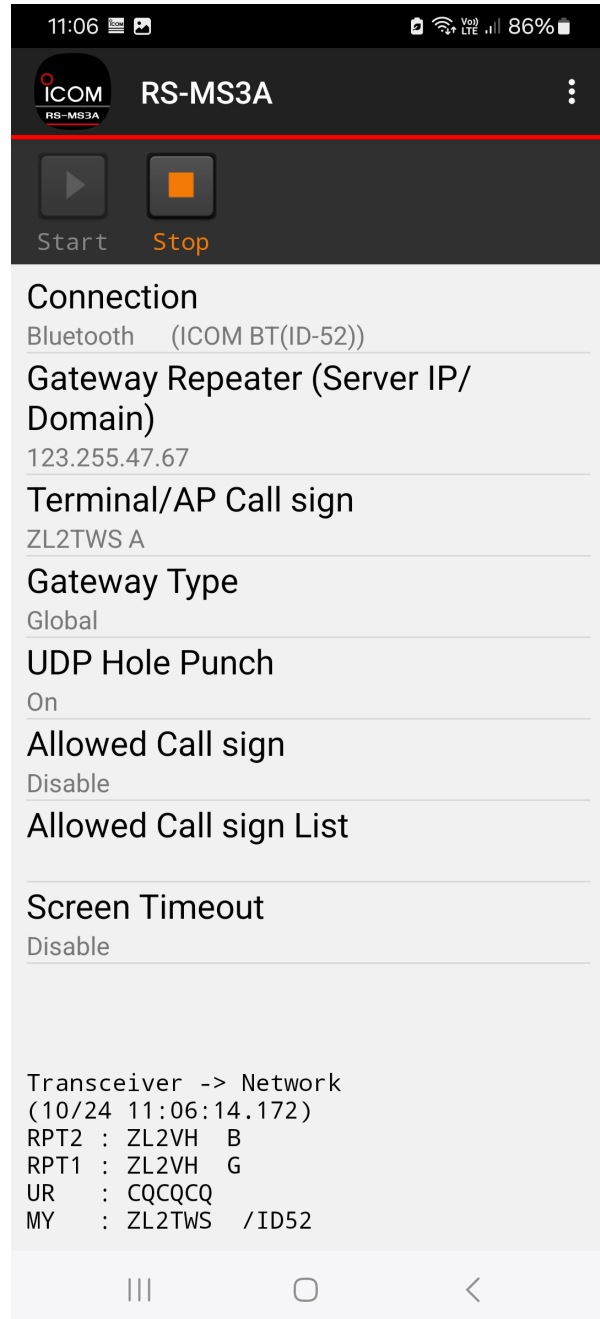No traffic is heard via any of the ZL2VH modules.

RS-MS3A (TM) for Android Phone Installation and setup:
1) Download and install RS-MS3A from the Android play store.
2) If using an ID-52 Plus (60th) turn on the phone **Bluetooth** and pair (ICOM BT(ID-52))
3) If using an ID-52 Plus (60th) turn on the radio **Bluetooth** and pair to the phone name.
4) With reference to Picture-7 and Picture- 8 below (RS-MS3A) enter the following details.
5) With the USB to Phone cable, press "Connection"and choose the **USB**.
6) With no USB cable and ID-52A Plus (60th) press "Connection" and choose **Bluetooth.**
7) Enter the Gateway Repeater (Server IP/Domain) for ZL2VH enter: **123.255.47.67**
8) Enter the TM/AP call sign with the **A** suffix one space after a six letter call sign. (8th Character)
9) Enter the TM/AP call sign with the **A** suffix two spaces after a five letter call sign. (8th Character)
10) Select Gateway Type as **Global.**
11) UDP Hole punch **OFF**. **ON** if router 40000 cannot be opened for return network station only.
12) Allow call sign is **Disable** as this is only used for **AP** mode to allow selected CS's.
13) Allow call sign list is the CS's that you allow **AP** operation via your radio.

NOTE: If you use a cellular system, you need an IPv4 Global IP address assigned to your Windows or
Android device. Read Page-10 of the DV Gateway Function icom document.

Picture 7 (left screenshot)

11:04   86%

ICOM RS-MS3A   ⋮

▶ Start   ■ Stop

Connection
Bluetooth   (ICOM BT(ID-52))

Gateway Repeater (Server IP/ Domain)
123.255.47.67

Terminal/AP Call sign
ZL2TWS A

Gateway Type
Global

UDP Hole Punch
On

Allowed Call sign
Disable

Allowed Call sign List

Screen Timeout
Disable

```
Network -> Transceiver
(10/24 11:02:59.873)
RPT2 : ZL2TWS A
RPT1 : ZL2TWS G
UR   : ZL2TWS
MY   : ZL2TWS G/
```

Pictures-7

Picture 8 (right screenshot)

11:06   86%

ICOM RS-MS3A   ⋮

▶ Start   ■ Stop

Connection
Bluetooth   (ICOM BT(ID-52))

Gateway Repeater (Server IP/ Domain)
123.255.47.67

Terminal/AP Call sign
ZL2TWS A

Gateway Type
Global

UDP Hole Punch
On

Allowed Call sign
Disable

Allowed Call sign List

Screen Timeout
Disable

```
Transceiver -> Network
(10/24 11:06:14.172)
RPT2 : ZL2VH  B
RPT1 : ZL2VH  G
UR   : CQCQCQ
MY   : ZL2TWS  /ID52
```

Picture-8

Operation is similar to that above using the RS-MS3W so only two pictures are shown.

Congratulations and now that you have TM mastered it's time to try Access Point Mode.
AP mode turns your radio into a high power hotspot.
Be careful to use a simplex frequency compatible with your country or regions band plan.
We will start here with RS-MS3W using **Bluetooth** with the ID-52 Plus (60th)
The same RS-MS3W and RS-MS3A setup is used with USB connections to other radios listed on Page-1
"Radios tested:"

Access Point (AP) Mode setup.

Access Point Mode Prerequisites:

1) IPv4 Global IP address is required as used on a typical home router.
2) IPv4 router requires the following port to be forwarded: 40000.
3) The port must be associated with the device connected to the IPv4 router. i.e. a PC or phone.
4) The server you want to connect to should have ports 20000, 40000, 12345 and 12346 open.
5) RS-MS3A downloaded from the App store and V1.41 or above.
6) RS-MS3W downloaded from the icom Japan web site and V1.31 or above.
7) Radio listed above with TM/AP capability and using icom specified cable.
8) Read the document **"About the DV Gateway function"** from the icom Japan web site.
9) Download the appropriate USB driver from the icom web site for use with the data cable.
10) Register a TM/AP call sign at the G3 server you registered your bass call sign.
     It is recommended that any suffix can be used except for E, G, I and S with most using A.
11) Only one device using the call sign connected to the router at one time. i.e any hotspot or
     Dongle connected using the same CS will prevent TM from working. D-Star is CS based.

To use RS-MS3W

Follow the RS-MS3W Installation 1) to 9) and setup as seen on Page-1 with these changes:
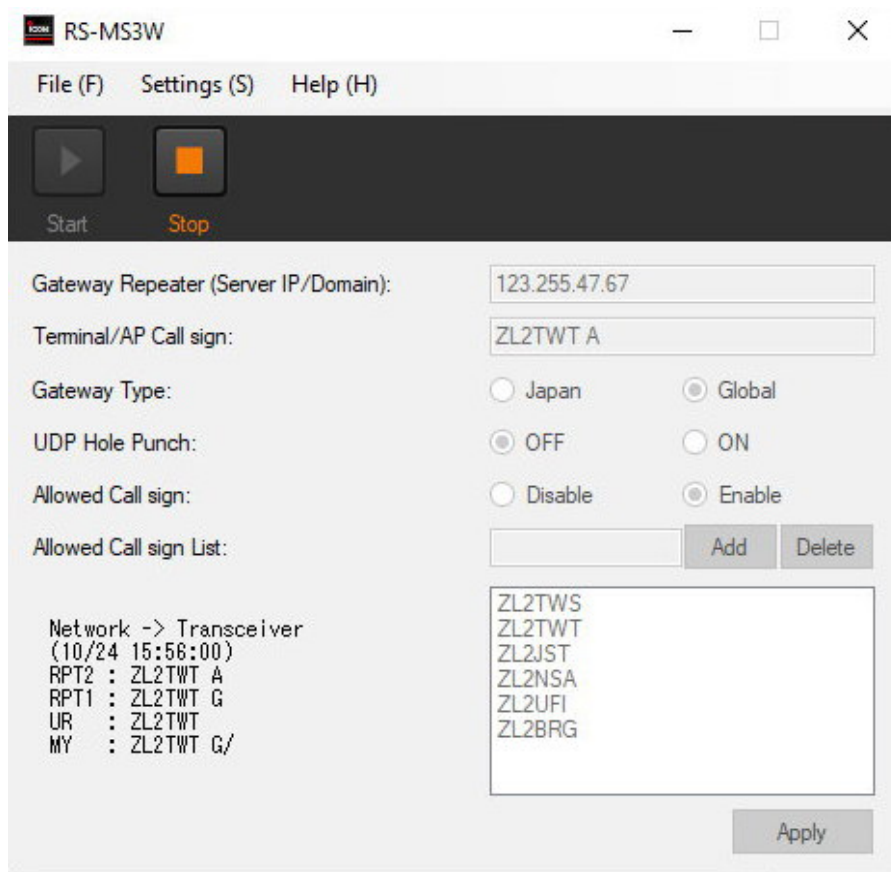
12) Allow call sign is **Enable** as this is only used for **AP** mode to allow selected CS's.
13) Allow call sign list is the CS's that you allow **AP** operation via your radio.
14) Set the power output of your radio to an appropriate level. I use S-Low or Low1 Save on battery.
15) Choose the RF simplex frequency using the VFO/MHz button of top rotary dial.
12) With RS-MS3W Started then select <<Access Point Mode>> within 30 seconds as with TM.

Picture-9 shows the ID-52A Plus (60th) in Access Point on simplex 431.250 MHz.
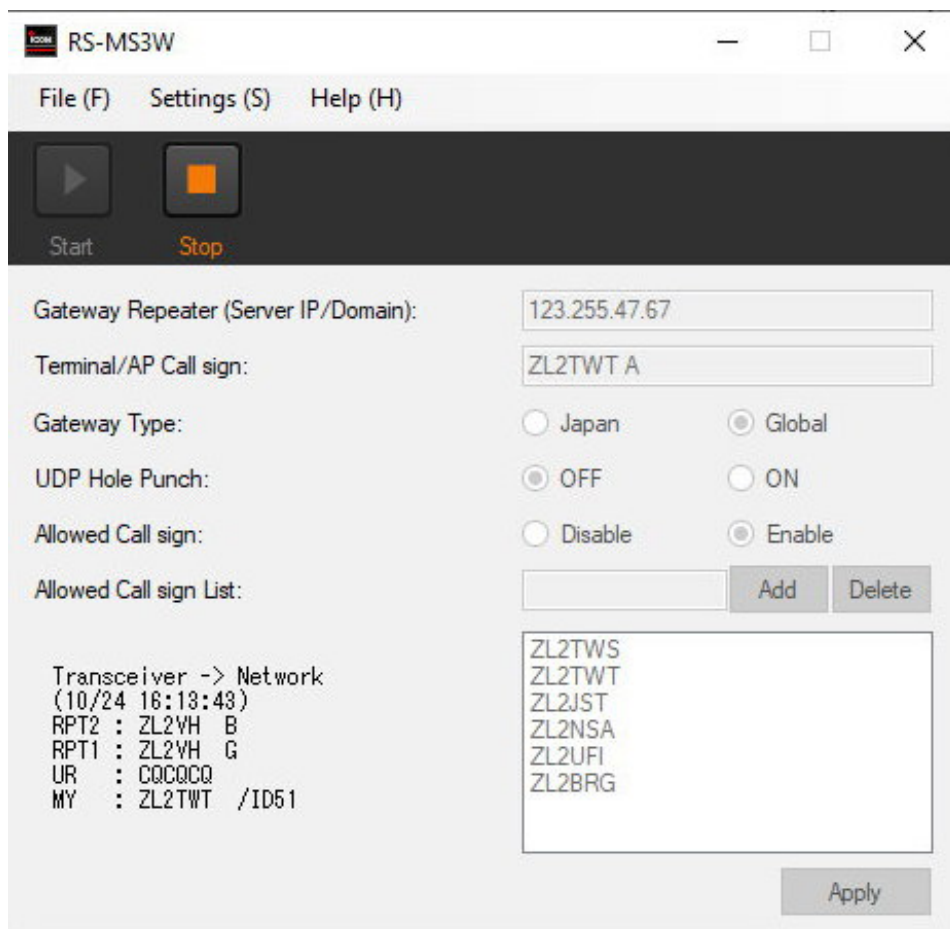

Picture-9 shows AP on UHF simplex USB connected to PC

Picture-10 below shows RS-MS3W with Allowed Call Signs and connected to ZL2VH ready to receive from the Network -> transceiver.

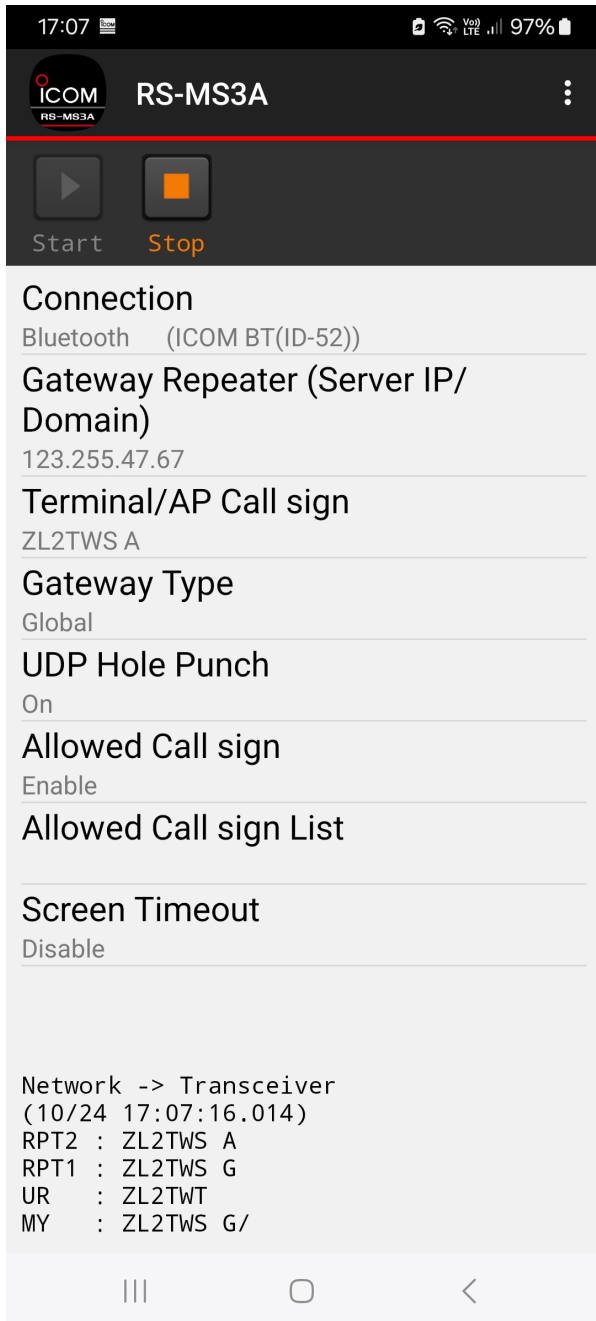Picture-10 shows ZL2TWT A connected to ZL2VH and QSO ready between listed CS

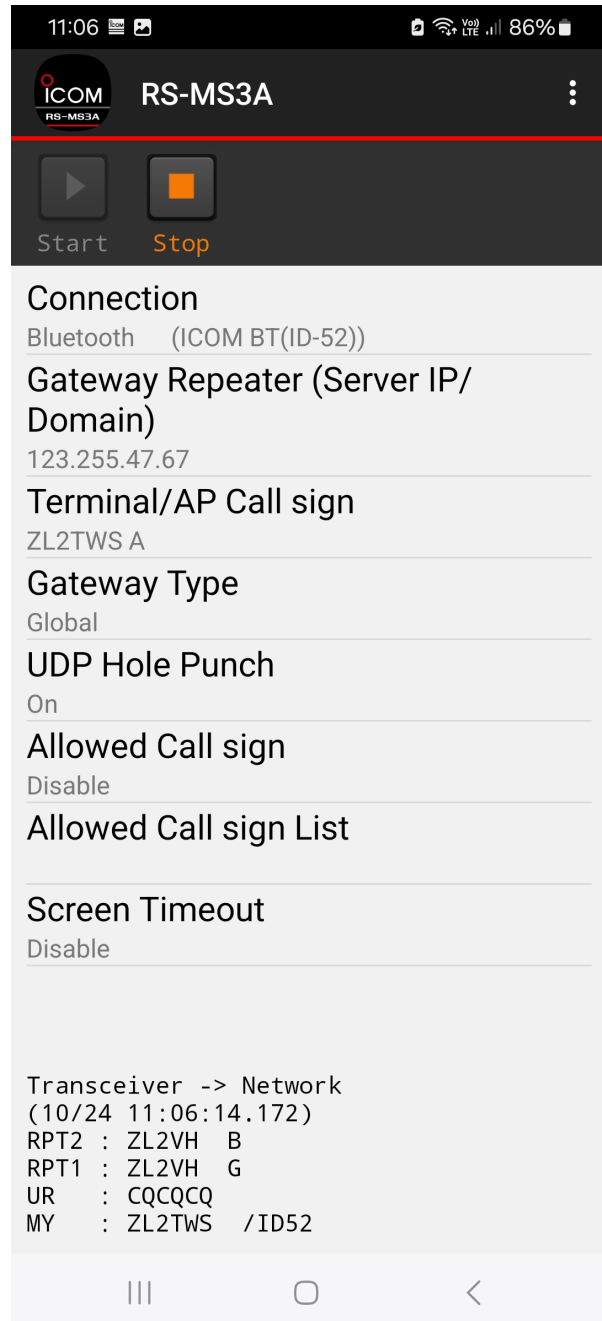Picture-11 below shows ZL2TWT calling CQ on ZL2VH B.

To use RS-MS3A

Follow the RS-MS3A Installation 1) to 11) and setup as seen on Page-5 with these changes:

4) With reference to Picture-12 and Picture-13 below (RS-MS3A) enter the following details.

12) Allowed call sign is **Enable** as this is used for **AP** mode to allow selected Call Signs.

13) Allowed call sign list is the CS's that you allow **AP** operation via your radio.

14) Set the power output of your radio to an appropriate level. I use S-Low or Low1 Saves on battery.

15) Choose the RF simplex frequency using the VFO/MHz button of top rotary dial.

16) With RS-MS3A Started then select <<Access Point Mode>> within 30 seconds as with TM.

17:07 ☐ 📶 📶 97%🔋	**11:06** ☐ 📶 📶 86%🔋
ICOM **RS-MS3A** ⋮	ICOM **RS-MS3A** ⋮
▶ ■	▶ ■
Start **Stop**	Start **Stop**
Connection	Connection
Bluetooth (ICOM BT(ID-52))	Bluetooth (ICOM BT(ID-52))
Gateway Repeater (Server IP/ Domain)	Gateway Repeater (Server IP/ Domain)
123.255.47.67	123.255.47.67
Terminal/AP Call sign	Terminal/AP Call sign
ZL2TWS A	ZL2TWS A
Gateway Type	Gateway Type
Global	Global
UDP Hole Punch	UDP Hole Punch
On	On
Allowed Call sign	Allowed Call sign
Enable	Disable
Allowed Call sign List	Allowed Call sign List
Screen Timeout	Screen Timeout
Disable	Disable
Network -> Transceiver (10/24 17:07:16.014) RPT2 : ZL2TWS A RPT1 : ZL2TWS G UR : ZL2TWT MY : ZL2TWS G/	Transceiver -> Network (10/24 11:06:14.172) RPT2 : ZL2VH B RPT1 : ZL2VH G UR : CQCQCQ MY : ZL2TWS /ID52
‖‖ ◯ ‹	‖‖ ◯ ‹

    Picture-12 ZL2TWS QRV AP Mode   Picture-13. ZL2TWS calling CQ AP Mode

Note: Allowed call sign list does not show like the RS-MS3W due to the lack of display space however tapping the Allowed Call sign will open the list separately.

Congratulations!. You have AP mode working and can use your radio as a high power hotspot. I hope that this paper helps owners of the TM/AP radios to fully utilise their icom radio.

Router Port Forwarding for a home router HG659.
Note: Modems are not the same so use this below as a guide.

To forward port 40000 UDP a rule has to be created. Picture-14 below.

Picture-14. Named 40000 Port rule showing UDP Protocol.

Picture-15 below shows the Port forward rule now applied to the device at Application. In this case a PC device using RS-MS3W and named ZL2TWS-TM3410M_Ethernet. (Internal Host)

Picture-15. Port rule applied to a device.

TM / AP mode RS-MS3W and RS-MS3A
Known Errors, App behaviour and useful Tips.

1) Bluetooth sometimes requires Un-Pairing and to be Re-Paired to establish a reliable link.

2) ERROR - "No answer from the transceiver" is caused by TM or AP being turned off on the
   radio.

3) ERROR - "Bluetooth connection disconnected" is caused by the BT being Off on either
   RS-MS3A Android phone or on the ID-52A Plus (60th) radio.

4) Calls via Hotspots and Dongles connected to a G3 module do not pass traffic back to TM/AP
   connected stations.

5) If ZL2TWT M (mobile suffix) is heard by the TM/AP user only the base call is required in the
   like this UR:/ZL2TWT in order to return that call. CS>CS does not consider the suffix even if
   the station is using one.

6) After changes to RS-MS3W and RS-MS3A there is often a 1 minute delay before a handshake
   is established between the server and CS.

7) After port forward is changed in a router and associated with a device icom recommends to
   wait at least 3 minutes before using TM/AP modes. Routers often take time to set new ports.

8) AP calls require / (slash) in front of the call sign UR: of the remote radio to work
   (Page-25 of DV Gateway Function document.

9) UDP Hole Punch operation is clearly explained from Page-8 onwards in the document
"About the DV Gateway function" from the icom Japan web site. UDP Hole Punch can be used with the
returning network connected station only. Document name for download: DV_Gateway_Web_ENG_4.pdf

For more information regarding D-Star check the Branch 63 web site here: https://zl2vh.nz/dstar.html

73 and enjoy using DV Gateway.

John ZL2TWS.