MDU – dSCR Plug-In Adapter Operational Overview

Version 1.01

6th November 2018
Version Control:

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Change</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>V 1.01</td>
<td>6th November 2018</td>
<td>First Draft</td>
<td>Chris Woods</td>
</tr>
</tbody>
</table>

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**Introduction:**

This document is to introduce the Unitron Plug-In dSCR Adapter (dCSS-422) as developed by Unitron in collaboration with Sky and its design and purpose for use in Multi Dwelling Units to deliver the correct signal format over a single cable for Sky Q functionality.

The information contained herein is by no means definitive and is subject to change in line with technological developments and also Sky’s current and future business requirements and processes.

As with any work carried out by Sky, its business partners or work carried out for or on behalf of Sky, safety to its customers, public, engineer/installer and to any equipment and property is paramount. All work must conform to all standards as laid down in the CAI Codes of Practice and to all European Standards (CENELEC) relating to signal distribution. All agents working on behalf of Sky must comply with all Health and Safety and legal regulations and requirements.

The Plug-In dSCR module has been designed with a reactive approach to installing Sky Q in MDU buildings with a fully functioning IRS or Sat Only systems in place. The main criteria for this were:

- To eliminate disruption and compromise to any of the existing system and/or equipment in place
- To speed up installation times for customers and Installers
- Minimise customer lead times
- Simplify the installation process to reduce the need of ‘systems engineers’ to carry out the installation.
Specifications:

<table>
<thead>
<tr>
<th>Voltage Input: 20V max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current: 230mA max</td>
</tr>
<tr>
<td>LNB Current: * 4x 100mA max</td>
</tr>
</tbody>
</table>

*The power supply from the DC input is directly coupled to the HL input. This can handle 1000mA maximum.

<table>
<thead>
<tr>
<th>LNB (Sat) Inputs:</th>
<th>950MHz ⇔ 2150MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrestrial Input:</td>
<td>88MHz ⇔ 790MHz (LTE 800)</td>
</tr>
</tbody>
</table>

RF Input Power:

<table>
<thead>
<tr>
<th></th>
<th>SCR</th>
<th>Legacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Input (aggregate)</td>
<td>59dBµV</td>
<td>59dBµV</td>
</tr>
<tr>
<td>Max Input (aggregate)</td>
<td>&gt;110dBµV</td>
<td>102dBµV</td>
</tr>
</tbody>
</table>

Note: these are the full technical specifications, when installing the DCSS 422 the readings on the Skymaster meter MUST be, between 65-85dBuV.

Insertion Loss:

<table>
<thead>
<tr>
<th>Satellite</th>
<th>SCR/Legacy ports</th>
<th>Terrestrial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-15dB δ +25dB (With AGC)</td>
<td>Legacy Only ports</td>
</tr>
<tr>
<td></td>
<td>2±2dB</td>
<td>-3dB Typ</td>
</tr>
</tbody>
</table>

Sky Homes MDU Doc10015 V 1.01
Modes of Operation:

The dCSS-422 has 2 standard Legacy outputs and 2 SCR/Legacy outputs. The last 2 ports can independently work in SCR or Legacy Mode, only when powered locally via a 20V power supply. By default, the module is set to Legacy mode for all outputs. When a Sky Q set top box is connected and set into SCR mode the module will automatically switch from Legacy to SCR mode on the 2 SCR/Legacy outputs, upon the first DiSEqC command. If SCR mode has been activated, disconnect the appropriate output to go back to Legacy mode.

**dSCR Modes:**

<table>
<thead>
<tr>
<th>dCSS-422</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCR mode:</td>
</tr>
<tr>
<td>Legacy mode:</td>
</tr>
</tbody>
</table>

**SCR mode: status LED slow blinking green**

When a Sky Q Set Top Box is connected and set in 'SCR Mode', up to 16 User Channel Bands can be generated and can be tuned independent of each other to look at any LNB input and any transponder frequency on that input. The dCSS-422 reacts on the Sky-standard. In DiSEqC commands the set top box sends the desired data for the LNB input and frequency to be selected.

**Legacy mode: status LED solid green**

When a Legacy Set Top Box (non-SCR Compatible) is connected to any of the ports and the dCSS-422 is DC powered via the DC input port, the dCSS-422 works like a standard multiswitch allowing only one tuner to be connected to each output and allowing the tuner to select a single band, polarity and frequency from the relevant transponder using 13/18V and 0/22kHz tone switching.

**Legacy mode special cases to prevent overloading the DC circuits of the STBs**

When no DC is present on both SCR output ports and DC input port, the upper legacy ports work in a different mode. They will get the satellite signal from the opposite inputs VH and HH, to save current consumption. The DC and 22KHz is then forwarded to their opposite port.

1. When no DC is present on the DC input, both SCR/Legacy ports only work in SCR mode. This means no legacy mode is possible on these 2 output ports.
2. When no DC is present on the DC input, both SCR/Legacy ports only work in SCR mode. This means no legacy mode is possible on these 2 output ports.
Power Requirements:

<table>
<thead>
<tr>
<th>Max Power Consumption:</th>
<th>with LNB load</th>
<th>w/o LNB load</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Power Port</td>
<td>8W</td>
<td>5.5W</td>
</tr>
<tr>
<td>From STB* in SCR mode (per chip / pair of ports)</td>
<td>8W</td>
<td>5.5W (per chip)</td>
</tr>
<tr>
<td>From STB in LNB emulation mode (SCR Ports)</td>
<td>5.5W</td>
<td>&lt;3W (per port)</td>
</tr>
<tr>
<td>From STB in LNB emulation mode (Legacy Ports)</td>
<td>3.5W</td>
<td>&lt;1W (per port)</td>
</tr>
</tbody>
</table>

*with power inserter installed

The adapter is DC powered - either via DC Input port @20V (F-Type Connector) or via the subscriber ports (STB/Power Inserter) @10-20V

The Plug-In Adapter is **not** a cascadeable switch and as such there is no trunk line and cannot be 'Trunk Powered'.

Where possible the **preferred and ‘Best Practice’** method for powering the adapter is via the 20V DC input from a PSU in the headend location (Local power). Where multiple dCSS units are being used, we have now available a ‘Power Splitter’ which will allow the powering of several dCSS units from one 20V 3A PSU – negating the need for additional power sockets and PSUs or extension leads” however, in certain circumstances this will not be possible and the use of an OEM Power Inserter in the customers property will be required to power the port on the adapter.

If an OEM Power Inserter is going to be used to power the port on the adapter then it **MUST** be an **SP161** type inserter as this is the only unit that is compatible with the DCSS 422 Plug in dSCR.

Plug-in Adapter dCSS Legacy and SCR port output specs. Depending on how the unit is powered.

**Power supply unit (PSU) fitted to DC Input:** Legacy ports output: Standard Sat Signals and Terrestrial. SCR ports output: dSCR Sat Signals for Q, Standard Sat Signals and Terrestrial.

**Power Inserter (PI) in customer’s property:** Legacy ports output: Standard Sat Signals and Terrestrial. SCR ports output: dSCR Sat Signals for Q and Terrestrial. (Standard mode is not supported, a Sky+ or FreeSat box will not work) **DCSS not powered:** Legacy ports output: Standard Sat Signals and Terrestrial. SCR ports output: Terrestrial only.
Installation Guidelines:

The Unitron dCSS-422 is designed as an ‘Add On’ dSCR, taking it’s inputs from the outputs of a standard multiswitch—negating the need to ‘break into’ the trunk lines of the existing system and without compromising the integrity of the existing signal levels at any other point of the system.

Steps:

1. An engineer needs to locate the headend where the customers subscriber cables are connected to. This will vary from block to block but normally will be located in a riser cupboard accessible from a communal area. These could be on the same floor as the property or it could be located on adjacent floors.
2. Once the headend has been located the engineer must determine that the system is suitable to accept a Plug-In Adapter—see below:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Feed</td>
<td>POWERED SYSTEM</td>
<td>✓</td>
</tr>
<tr>
<td>Single Feed</td>
<td>NO POWER</td>
<td>✗</td>
</tr>
<tr>
<td>Dual Feed</td>
<td>POWERED SYSTEM</td>
<td>✓</td>
</tr>
<tr>
<td>Dual Feed</td>
<td>NO POWER</td>
<td>✓</td>
</tr>
<tr>
<td>Analogue SCR</td>
<td>POWERED SYSTEM</td>
<td>✓</td>
</tr>
<tr>
<td>Fibre to The Home</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Multi Sat Systems 9, 13, 17 wire</td>
<td></td>
<td>✗</td>
</tr>
</tbody>
</table>

3. The engineer must also ascertain that the system is ‘Earthed’ and that it is safe to work on, and that ALL equipment (which will include the dCSS-422) are cross-bonded to an earth point Also, the engineer must ensure that the integrity of the existing system is sound i.e. cables are not damaged or frayed, no water ingress etc.
4. If the system is found to be suitable, the customers subscriber cable(s) need to be identified (...unless already clearly labelled and confirmed to be the correct cables). This needs to be done by ‘toning/belling’ out the cables.
5. Once the cables are identified, these need to be clearly labelled (unless already labelled) with the customers apartment number (...on all cables) and also the cable to be used for connection to the Q box must be additionally labelled with “Q” for easy identification. In addition to labelling the cables, it is expected that the engineer will also mark the Plug-In Adapter with the corresponding apartment number against the port used.
6. The dCSS-422 Plug-In Adapter needs to be fixed securely in the headend following current dSCR guidelines wherever possible i.e. not stacked, Unused ports to be terminated with 75Ω terminators etc.

7. Where possible, utilise unused ports on the multiswitch first (no resident impact) and then the engineer needs to check the output levels from the 4 ports that they are looking to disconnect and connect to the Plug-In Adapter using their SkyMaster meters. Each port needs to be data logged to ensure all transponders pass, and that the signal levels are at the required levels for the DCSS422 adapter, which are, 65-85dBuV to ensure correct operation of dCSS legacy outputs.

8. Whilst testing outputs from the Plug-In Adaptors, it was found that the Rover SkyMaster3 meters output 1.7-2.0V peak-to-peak when sending commands to the Plug-In Adapter—the specification should have been 1V max. As a result of this the Adapter due to its ESD (Electro Static Discharge) Protection circuitry does not recognise the command to switch to High Band and results in the logs as failing.

On many of the High Band transponders, Q boxes and Legacy boxes operate at the correct levels and the Plug-In Adapters do not have any problems recognising commands from these devices and operate correctly.

To overcome this and ensure that engineers are seeing and logging correct levels, we have had 22KHz Tone Attenuators developed which will sit between the SkyMaster3 meter and the Adapter attenuating the tone voltage down to the correct level see diagram below:

9. Once the engineer is confident that there are no issues with the feeds from the multiswitch, they can then proceed to install the Plug-In Adapter— connecting the Q customer to one of the SCR ports (...or
both cables to both SCR ports in the case of a dual feed system) - the other two/three cables (...if utilised) to the remaining ports on the Plug-In Adapter.

10. The install can now commence as normal in the customers property but ensuring that the Q box is set to ‘SCR Mode’ from within the Installers / Settings Menu. We would recommend that the engineer completes another data log of all transponders at the customers wall plate to ensure the integrity of the signal has been maintained.

11. Complete install process within the Enablement App and when prompted scan the bar-code on the Plug-In Adapter and allocate stock, P.I’s, PSU’s, Terminators etc.
Flow Chart Processes:

Single Feed Systems:

Single Feed – No Power @ Headend
where customer is connected

Plug-in Adapter cannot be used
Offer / Install Sky+HD Classic
Complete / cancel Install

Single Feed – Power @ Headend
where customer connected

Plug-in Adapter to be used
Install Plug-in Adapter
Complete Q Install

Dual Feed Systems:

Dual Feed IRS Power @ Headend

Plug-in Adapter to be used
Install Plug-in Adapter
Transfer both customers cables over to both SCB ports
Complete Q Install – Utilising only one of the subscriber cables

When second customer needs to be connected – utilise one of their cables
and connect to the SCB port not being used by the first customer.

Dual Feed IRS No Power @ Headend

Plug-in Adapter to be used
Install Plug-in Adapter
Transfer both customers cables over to both SCB ports
Use Power Inverter.
Complete Q Install – Utilising only one of the subscriber cables

When second customer needs to be connected – utilise one of their cables
and connect to the SCB port not being used by the first customer.
Use Power Inverter.

Shared Dish No Power @ Headend

Plug-in Adapter to be used
Install Plug-in Adapter
Transfer both customers cables over to both SCB ports
Use PSU & Splitter method (See Page 17/18)

When second customer needs to be connected – utilise one of their cables
and connect to the SCB port not being used by the first customer.
Use PSU & Splitter method (See Page 17/18)

eSCR System

Plug-in Adapter to be used
Install Plug-in Adapter
Complete Q Install
System Scenarios:

Existing System in Situ

Headend 1

Headend 2

Headend 3

Headend 4
Existing System (Single & Dual Feed) + Plug-In dSCR

...with Headend power
Existing System (Dual Feed) + Plug-In dSCR

...with no Headend power

Headend 1

Headend 2

Headend 3

Headend 4

These must go to the same apartment or to 2nd CR install with Power Inverter.
Existing ‘Tapped/Split’ System (Single or Dual Feed) + Plug-In dSCR’s ...with Headend power
Existing ‘Tapped/Split’ System (Dual Feed) + Plug-In dSCR’s ...with no Headend power
Shared Dish:

Shared Dish scenario where the system is receiver powered
In shared dish systems we would look to use a PSU within the customers property, utilizing the customers 2nd feed, to power the dCSS and system it is connected to, as in a majority of cases the current draw on a P.I would be too great.
Disclaimer:

All the above product specifications and installation processes are correct at the time of publication of this document, but both specifications and processes are subject to change.

This document is intended to be viewed as a current guideline and with the understanding that any changes and/or updates will be made available as and when revisions are made to the product and/or process.