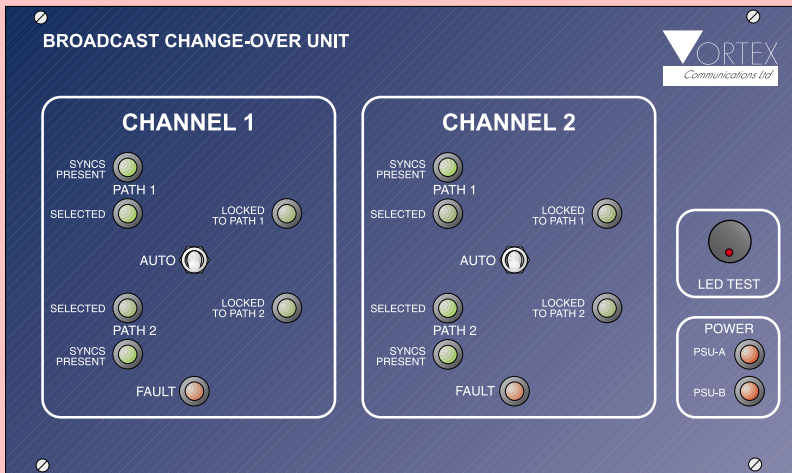


# BCU-300 VIDEO & AUDIO BROADCAST CHANGEOVER UNIT

BCU-300



▼ Control panel for a typical configuration, two channels on two paths

## DESCRIPTION

The **BCU-300 Broadcast Changeover Unit** provides a comprehensive solution to programme circuit backup for both video and audio. It is based on the well-proven

Vortex VX-2005 programme fail detection modules, which can be configured to detect loss of audio or video signals, including video with sound in syncs.

**To ensure continuity of transmission**, signals are generally distributed via 2 (or more) separate paths to the transmitter. The BCU-300 monitors these signal paths and selects between them using programmable array logic. The comprehensive programming capabilities of the BCU-300 can be customised to particular applications.

Special hardware configurations can be supplied to order.

**Alarm and status output**, front panel manual override, and remote control operation are all provided as standard.

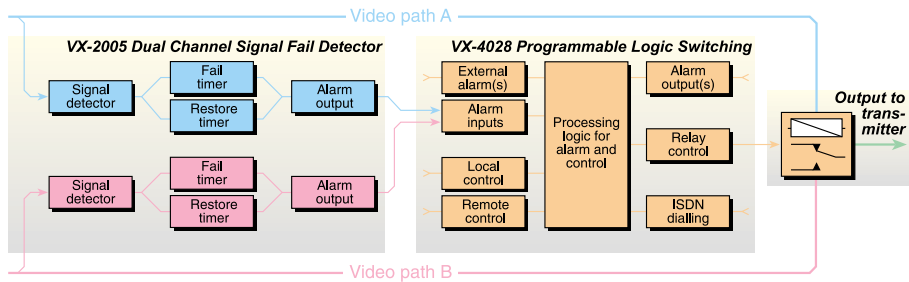
**The BCU-300 has been fully laboratory tested** for EMC emission and immunity, and every care has been taken to avoid long signal paths within the unit, to ensure transparent performance for the programme signal chains.

## How it Works

▼ The BCU-300 consists of two principal functional elements: a programme fail detector module (the VX-2005 Eurocard) and a programmable logic switching module (the VX-4028 Eurocard).

Each VX-2005 programme fail detector module has two entirely independent channels, each of which can be configured to monitor either video or audio. The module applies three user-adjustable criteria to the programme signal to determine whether an alarm condition exists:

Firstly, the video sync or audio level is measured. For an audio signal to be acceptable, its level must be greater than the **threshold**, or minimum acceptable level, while a video signal's syncs must fall within a **window**, being neither above or below an acceptable range of values.



When the signal falls outside these acceptable limits a timer is triggered. If the signal returns within limits then the timer is cancelled, but if it reaches the **fail time** then an alarm is triggered, providing a signal to the VX-4028 logic switching module and also made available externally through voltage-free contact closures.

Once the alarm is triggered the programme fail detector continues monitoring the original feed, and a timer is started as soon as the signal returns to within acceptable limits. If the signal remains so until the timer reaches the **restore time** then the alarm condition is removed (though this may have no effect on routing, which will be determined by the programming of the logic switching module).

The VX-4028 programmable logic switching module acts upon an alarm signal to restore the programme circuit. The signal may be the alarm from the VX-2005 programme fail detector module or an external alarm, such as a bit error rate signal.

The programmable array logic can be configured to suit the range of alarm signals available and the operating conditions required for almost any conceivable implementation. The logic is stored on PALs and can be easily re-configured should the operational requirements change.

On receiving an alarm, the module will provide a signal to the changeover relay only if all conditions specified are matched. These can include manual and remote override of any of the normal states (with either manual or remote control taking preference); channel locking (where two or more channels

must always follow the same path to avoid timing differences); dialling and codec framing (for ISDN backup circuits); and, of course, the presence of a good signal on the alternative channel.

The effect of restoring the original signal is also dependent upon the programming in the logic switching module. Where there are two permanent circuits it may be appropriate to minimise switching and regard each circuit as equal, but with an ISDN backup (where there is a cost in using the circuit) the system would be programmed to return to the preferred circuit. Alarm and status signals are provided on the front panel, and on voltage-free contacts for use in conjunction with external equipment.

## Video Backup

▼ The main and backup programme feeds to the transmitter are usually carried by permanent circuits, either analogue or digital. These may carry sound-in-syncs and, if there are two or more programme channels, these are probably fully synchronized. Digital signals are externally decoded prior to monitoring, and there may be a digital bit error rate signal available for monitoring, too.

The sync level of the analogue signal is constantly monitored by the BCU-300, which first removes the audio from a sound-in-syncs signal. If the sync level moves outside the acceptable window (typically around -6dBV to +6dBV, but there need be no upper limit), the fail timer is started. If the fail time elapses without the signal recovering, then an alarm is triggered.

As syncs are constantly present in a video signal, the fail time is set typically to around 20ms, to allow for dropout. The bit error rate alarm, which indicates a corruption of the signal, would cause an immediate alarm.

**Two independent permanent circuits** will almost certainly be available, in which case the BCU-300 can monitor both paths constantly and simply switch from one circuit to the other in the event of a failure. In order to minimise switching, the unit would probably be programmed to stay on the selected path even when the original circuit is restored.

The restore time is usually set to around 1 second, long enough for a steady stream of pulses.

**To minimise the timing differences** between circuits in multi-channel implementations, the BCU-300 allows the path-switching of all channels to be locked together.

If one channel fails on its current path, then it and all other channels will be switched together to an alternate path.

## Audio Backup

▼ The main programme feed to the transmitter is normally carried by some form of dedicated line or satellite feed, in either analogue or digital form. If the signal is digital, it will be externally decoded into analogue for monitoring, and the decoder may additionally provide a bit error rate to trigger an alarm if the digital signal becomes corrupt (this gives an earlier warning of transmission problems).

The analogue signal is constantly monitored by the BCU-300 and, if it falls below the threshold (typically set to around -35dBu), the fail timer is started. If the fail time elapses without the signal recovering, then an alarm is triggered.

Since silence is very much a part of normal audio, a typical fail time would be around 20 seconds and could be as long as a minute. The bit error rate alarm, which indicates a corruption of the digital signal, would cause an immediate alarm.

**With two independent permanent circuits**, the BCU-300 constantly monitors both paths and simply switches from one to the other in the event of a failure. In order to minimise switching, the unit is programmed to stay on the selected path even when the original circuit is restored.

**When a dial-up ISDN backup circuit** or other temporary link is used for the backup, then the BCU-300 can be programmed to initiate the dialling procedure, monitor the connection and measure the programme signal before switching to the backup feed. As soon as the permanent circuit is restored the BCU-300 will revert to that and clear down the temporary link, to minimise call charges.

The restore time for audio is generally set at around 10 seconds, to ignore momentary levels above the threshold when re-connecting equipment.

# BCU-300 VIDEO & AUDIO BROADCAST CHANGEOVER UNIT

## CONFIGURATIONS

- ▼ **The design of the BCU-300** video and audio broadcast changeover unit is based on Eurocard modules, allowing easy configuration for the number and type of programme circuits and paths, while the programmable array logic enables control and functionality to be tailored to each implementation.
  - ▼ **One or more programme circuits** may be routed over two or more paths, with constant monitoring of all paths.
- ▼ **The BCU-300 is normally equipped with relay changeover** switching modules, giving a copper-to-copper path through the unit for maximum reliability. Active electronic switching modules can be supplied if required.
  - ▼ **Switch daughtercards** are installed in the rear of the rack, keeping path lengths short and ensuring signal continuity.
- ▼ **The BCU-300 is equipped with dual power supplies** with alarm outputs for all supply rails. Both DC input and mains versions are available.
  - ▼ **Input signals from external devices** are opto-isolated from the BCU-300.
  - ▼ **Status outputs and remote control** for external equipment are made available on voltage-free relay changeover contacts
- ▼ **Remote control and status monitoring** are provided through voltage-free contact closures.
  - ▼ **Programme circuits may be locked together** so that they always follow the same path as one another, avoiding timing differences.
- ▼ **Manual selection of the path** is available from the front panel for each programme circuit.
  - ▼ **Remote control, with full status** and operational information, is available.
    - ▼ **Automatic, manual and remote control functions** are configured hierarchically, allowing one form of control to supersede another as each implementation requires.
  - ▼ **The logic of the BCU-300 is entirely programmable**, allowing specific functionality appropriate to each implementation.
    - ▼ **The system can be programmed to minimise re-routing**, or to revert to a preferred path whenever possible.
- ▼ **Control of dial-up ISDN backup is incorporated** within the main logic of the BCU-300, which can also react to bit error rate signals from digital decoders.
- ▼ **The logic is re-programmable**, so the mode of operation can be altered to suit new conditions.
  - ▼ **The BCU-300 has been fully laboratory tested** for EMC emission and immunity. Every care has been taken to avoid long signal paths, to ensure transparent performance.

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