EPICS records with brief descriptions and names of the organization that
developed or uses/used the record (or [BASE], if the record is in EPICS
base 3.14.6, or [BASE313], if the record was in base 3.13.9 and is not
in base 3.14.6). Some guesswork was involved in compiling this list.
Not all of these records are currently maintained.

aai     array analog input [BASE]
aao     array analog output [BASE]
ai      analog input [BASE] [REFMAN]
ao      analog output [BASE] [REFMAN]
bi      binary input [BASE] [REFMAN]
bo      binary output [BASE] [REFMAN]
calc    calculation [BASE] [REFMAN]
calcout calculation and conditional output [BASE] [REFMAN]
compress compress float values [BASE] [REFMAN]
dfanout data fanout [BASE] [REFMAN]
eg      event-generator (custom hardware) [BASE]
egg     event-generator (custom hardware) event [BASE]
er      event-receiver (custom hardware) [BASE]
erg     event-receiver (custom hardware) event [BASE]
event   event [BASE] [REFMAN]
fanout  sequence of forward links [BASE] [REFMAN]
histogram bin a series of PV values into an array [BASE] [REFMAN]
longin  integer input [BASE] [REFMAN]
longout integer output [BASE] [REFMAN]
mbbiDirect multi-bit binary input variant [BASE] [REFMAN]
mbbi    multi-bit binary input [BASE] [REFMAN]
mbboDirect multi-bit binary output variant [BASE] [REFMAN]
mbbo    multi-bit binary output [BASE] [REFMAN]
permissive for communicating state information [i.e., for handshaking]
between a server and a channel-access client [BASE] [REFMAN]
sele    select a value based on criteria [BASE] [REFMAN]
seq     sequence of delay/read/write sets [BASE] [REFMAN]
state   string value for client-server, or client-client communication
         [BASE] [REFMAN]
stringin string input [BASE] [REFMAN]
stringout  string output [BASE] [REFMAN]
subArray   get part of an array [BASE] [REFMAN]
sub        subroutine [BASE] [REFMAN]
waveform   array [BASE] [REFMAN]

===============================================================================
Records not included in EPICS base 3.14.6
===============================================================================

ab1771IFE  Allen Bradley [ANL - allenBradley]
ab1771IX   Allen Bradley [ANL - allenBradley]
ab1771N    Allen Bradley [ANL - allenBradley]
ab1791     Allen Bradley [ANL - allenBradley]
abDcm      Allen Bradley [ANL - allenBradley]
aConcat    Join the several waveform into one. [KEK]
aiTrip     ai with two additional fields: TLNK and TREN. TLNK is a link that
            gets processed if a MAJOR severity condition is reached. TREN is an enable/disable
            field for this link. For software level trips to shut the beam off. [IPNS]
apply      Part of Gemini Command/Action Layer between IOC's [OSL]
araw       pick up every N element from waveform. [KEK]
archive    store values of a PV for use by an EPICS archiving client [?]
asyn       Generic interface to asyn port [ANL - asyn module]
bates_bpm  High-level control and processing for BMPS using Bates flash-ADC board. Supports
            multiple sampling modes, trigger delay, sample window width, two layers of sample
            averaging, RMS and standard deviation, alarms, reference and delta values. Heavily
            integrated with driver/device support. [Bates]
beamh      beam history Module Control [ANL]
beamhchan  beam history Module channel [ANL]
beamLife   calculates storage ring beam lifetime [KEK]
bigGenSub  based on gensub with the following differences: 47 inputs; 26
            outputs; the user definable subroutines for initialization of
            data size for each input and output have been eliminated [CFHT]
biParam     bi with two additional fields: TLNK and TREN. TLNK is a link that
            gets processed if a MAJOR severity condition is reached. TREN is an enable/disable
            field for this link. For software level trips to shut the beam off. [IPNS]
bpmKek     based on BPM record from JLAB [KEK]
bpm        BPM with averaging, position calculations, and some user-
interface controls [ANL]

bpt
Breakpoint table lookup record (like what is used in ai, but uses double rather than int for raw value). [Duke]

busy
database interface to putNotify() - make a complex device useable by ca_put_callback() [synApps - sscan module]

cad
Part of Gemini Command/Action Layer between IOC's [OSL]

camac
Probes CAMAC [synApps - camac module]

car
Part of Gemini Command/Action Layer between IOC's [OSL]

cm
originally written to support the (custom) AT5 Diagnostic module, now a soft record - combination of calc with current-monitor trigger controls [ANL]

?command?
command shaper [Keck]

compactsubarray
copies entire waveform from its input record whenever it is processed. It means each subarray record will have a buffer to keep an input waveform. Requires small buffer which is large enough to keep an output waveform, which is usually much smaller than the input waveform. Unfortunately, you need to add a new database access routine in base. [KEK]

cpid
CEBAF PID record [JLAB] [REFMAN]

cvt
conversion record - Features 1 or 2 inputs (double), VAL = output (double). Conversion method selectable from linear, subroutine, 1d-table, 2d-table. On-line change of conversion method or table reload in the background without disruption of normal operation. Partly derived from ai and ao. No device support.

datalog
for logging data arrays [ANL]

ddlypulse
digital-delay pulse generator control [ANL]

ddlypulsedvme
digital-delay pulse generator control [ANL]

digitel
For Digitel 500/1500 and new MPC vacuum controllers [ANL]

dxp
XIA dxp custom [synApps - mca module]

ecdr814Board
support for the ECDR-814 digital receiver board [SPEAR]

ecdr814Channel
ecdr814RX
ecdr814

?encoder?
custom encoder [Keck]

epid
Enhanced PID record [synApps - std module]

fbuffer
buffer record for floats [ANL]

findPeak
find a peak in waveform, based on a compress record. [KEK]

genSub
Multi-I/O subroutine, handles arrays [OSL - genSub module]

gp307
Vacuum gauge from Granville Philips [ANL]
gpib    Probes GPIB [synApps - ip module]
hiv     Access LeCroy or CAEN HV mainframes [JLAB]
image   Intended to transfer a digitized image [i.e., 2D array of 1- or 2-byte integers] over channel access. [ANL]
interp  General-purpose interpolation [KECK]
iq      ai variant with hardware specific fields [ANL]
joinArray the opposite of a subArrayRecord. [SLS]
LongMbbiDirect Multi-bit binary record for LONG(32bits) data. [KEK]
lseq    long seq (16 outputs instead of 10) [JACH]
mbbi32Direct 32-bit version of mbbiDirect [ORNL - same as in base?]
mbbo32Direct 32-bit version of mbboDirect [ORNL - same as in base?]
mbbiTrip mbbi with two additional fields: TLNK and TREN. TLNK is a link that gets processed if a MAJOR severity condition is reached. TREN is an enable/disable field for this link. For software level trips to shut the beam off. [IPNS]
mca     Supports multichannel analyzers [synApps - mca module]
memscan Memory Scanner Module Control [ANL]
omsub   multiple-output sub (precursor to genSub) [OSL]
motor   Replacement for steppermotor record - also supports servo motors; different device and driver support; user/dial coordinates; backlash takeout; encoders [synApps - motor module]
msbpm   monitored BPM with averaging [ANL]
msbpmX  monitored BPM with averaging [ANL]
nmr     Hardware specific record for interface to NMR probes used for measuring magnet field. [Duke]
nslsdet For NSLS 384-element silicon detector, a derivative of the scaler record, with arrays to hold the counter data and per-element control info, and fields to control gain, shaping time and various diagnostic switches in the detectors. It is very specific to this hardware. [NSLS]
orl1Ai  AI for assignment to meters: percent field; two assignment fields; two scan rate fields [ORNL]
orl1Ao  AO for custom knob box: contains a percent field; knob gain field; saved value field; two fields to manage assignment to a knob; two scan rate fields - when assigned, SCAN is set to the fast rate; when deassigned, SCAN is set to the slow rate [ORNL]
orl1Sub A modified sub record that adds a void pointer that may hold a structure allocated at init. The subroutine uses this to keep track of state info. [ORNL]
p2RfAim Arc Interlock Module
p2RfCfm Comb Filter Module
p2RfClk         Clock Module
p2RfGvf         Gap Voltage and Feed Forward Module
p2RfRfp         RF Processing Module

One custom record per six custom RF VXI modules which are
loaded with features and have very large address maps plus DSP
interfaces - each record can be thought of as a combination of
many ai/ao/bi/bo/sub/seg/waveform records where the bulk of the
processing is done in device support. These records are
monsters but I think new people assigned to maintain them come
up to speed more quickly - it's easier to match the hardware
documentation and address maps with the software. [SLAC/SPEAR]

pal             Emulates PAL-type IC [BASE313]
pid             Implements PID control algorithm [BASE313] [REFMAN]

ps              For Bates integrated BitBus power supply controller. 1 DAC, 3
ADCs, DC control, interlock status/reset, ramping, cycling,
many alarms. Set/read in Amps, kG, MeV for calibrated magnets
[Bates]
pulseCounter    Control hardware that counts pulses [BASE313]
pulseDelay      Control hardware that generates a triggered pulse [BASE313]
pulseTrain      generate a pulse train, or control hardware that does this
                [BASE313]
rf              ai variant with hardware specific fields [ANL]
rt              ramptable. Used to generate the ramps for the booster ramped
power supplies. Works in conjunction with custom hardware.
[ANL]
runcontrol      a process that runs somewhere can register itself through this
                record, and for instance you could use it to avoid starting
                the same process twice in different machines. [ANL]
satRga          Spectra Satallite RGA (now MKS) - Superset of vacScan. [ANL]
scaler          Control a bank of counters [synApps - std module]
sCalcout        string-calc-output (cf. calcout record) [synApps]
scan            Programmatically set conditions and acquire data [BASE313]
scanparm        scan parameters for sscan record [synApps - sscan module]
sddsLaunch      ControlLaw Launch Record - used to start sdds epics tasks in the
                ioc [ANL]
serial          Probes Serial (replaced by asyn) [synApps - ip module]
?servo?         servo [Keck]
sir             Part of Gemini Command/Action Layer between IOC's [OSL]
spectrum        spectrum-analyzer - Calculate the one-dimensional FFT of a
                waveform. [ANL/LANL]
sscan           Programmatical conditions and acquire data (cf. scan
                record) [synApps - sscan module]
sseq  string sequence (cf. seq record) - Execute a sequence of EPICS writes to a set of EPICS PVs; optionally, wait for completion after write. [synApps - std module]

sSub  special subroutine, same as sub except with 26 inputs (A to Z) [SLAC/SPEAR]

status like 'longin' with forward links for each bit [ANL/ECT]

steppermotor First attempt at control for steppermotors [BASE313] [REFMAN]

strInMon just like a stringin, but produce a monitor every time a new string is received, EVEN IF IT IS THE SAME as the previous string. Greatly simplifies monitor driven control of string input systems. There's no need to write NULL's back into records so you will receive the next input (which create monitors themselves, that you have to handle!) [CFHT]

swait mostly superceded by calcout record. Evaluate a numeric expression; write the result to an EPICS PV; optionally wait for completion. [synApps - calc module]

swf  scaled waveform record - same as waveform but with raw offset and vertical scale factor and offset. Used in reading scopes. [BESSY]

table  Control a six-degree-of-freedom optical table [synApps - optics module]

timestamp Timestamp record, exports its timestamp as a string [SLAC]

timer  Configure timing outputs of a pulse generator [BASE313] [REFMAN]

?trajectory? trajectory control [Keck]

transform Like 'calcout', but supports 16 sets of (inlink, expression, value, outlink), named *A -- *P, executed in order. Expressions can use the results of any previously evaluated expression in the record. [synApps - calc module]

tsub  transform subroutine - a 'subroutine' record with lots of inputs and outputs [ANL/ECT]

ukpid  PID servo [JACH]

vacScan Spectra VacScan RGA (MKS - pretty much obsolete) [ANL]

vme  Probes VMEbus [synApps - vme module]

vxSymbol based on vme record. Can be replaced by symb lib. [KEK]

wait  early version of calcout [BASE313] [REFMAN]

watchDog  [KEK]

waveAnl waveform analysis - Compute simple statistics on a region of interest. [ANL/LANL]

waveout output waveform to a device. [KEK]

wfselector  [KEK]

wftime waveform with both time and Y, assumes both are double, for
input waveforms only. PREC, EGU, HOPR, LOPR provided for both time and Y. ESLO and EOFF provided for Y. NORD monitor goes off when changed (unlike waveform which I think is a bug). Used in reading time/value arrays from Keithley DVMs. [SLAC/SPEAR]

Links to entities named above:

[ANL] Argonne National Lab.; APS Accelerator Controls
http://www.aps.anl.gov/epics

(Division no longer exists)

(BASE) EPICS base 3.14.6
http://www.aps.anl.gov/epics

[Bates] MIT Bates Linear Accelerator Center
http://mitbates.mit.edu/

[BESSY] BESSY (Berlin synchrotron facility)
http://www-csr.bessy.de/control

[CFHT] Canada-France-Hawaii Telescope
http://cfht.hawaii.edu/

http://www.fel.duke.edu/epics/

[IPNS] Argonne National Lab.; Intense Pulsed Neutron Source
http://www.pns.anl.gov/computing/

[JACH] Joint Astronomy Centre
http://www.jach.hawaii.edu/JACpublic/JAC/software/epics/

http://www.jlab.org/accel/controls/controls.html

[Keck] Keck Observatory
http://www2.keck.hawaii.edu:3636/realpublic/epics/

[KEK] KEK, National Laboratory for High Energy Physics, Japan

[LANL] Los Alamos National Lab.
http://lansce.lanl.gov/lansce8/Epics/epics.htm

[NSLS] National Synchrotron Light Source

[ORNL] Oak Ridge National Lab.; Spallation Neutron Source
http://ics-webl.sns.ornl.gov/

[OSL] Observatory Scoences, Ltd.
http://www.observatorysciences.co.uk/epics.htm

[SLAC] Stanford Linear Accelerator
http://www.slac.stanford.edu/comp/unix/package/epics

[SLS] Swiss Light Source at the Paul Scherrer Institute
http://www.sls.psi.ch/controls/
[SPEAR] Spear at SLAC
http://www.slac.stanford.edu/~spear/epics/

[synApps] Argonne National Lab.; APS Beamline Controls
http://www.aps.anl.gov/aod/bcda/synApps

===============================================================================
CROSS REFERENCE
===============================================================================

Records emulating notions from existing programming languages
===============================================================================

scalar data type or simple structure
ai ao bi bo dfanout event longin longout sel
aiTrip biTrip busy cvt ornlAi ornlAo timestamp vxSymbol

bit map
-------
fanout mbbi mbbo mbbiDirect mbboDirect seq
mbbi32Direct mbbo32Direct LongMbbiDirect mbbiTrip sseq status lseq

array data type (not including string)
--------------------------------------
aai aao compress cvt histogram subArray waveform
aConcat aRaw bpt compactsubarray datalog genSub bigGenSub fbuffer
findPeak image joinArray mca nslsdet rt scan spectrum sscan swf waveAnl
waveout wfselector wftime

string data type
----------------
state stringin stringout
asyn genSub bigGensub gpib sCalcout serial sseq strInMon timestamp

array of variable (scalar) type
-------------------------------
waveform subArray
mca genSub bigGenSub swf

list
----
dfanout fanout sel seq
sseq lseq sCalcout transform

indexed list
------------
fanout sel seq
sseq lseq sCalcout wfselector

event - software interrupt exception
-------------------------------------
eg egevent er erevent event permissive
aiTrip biTrip mbbiTrip strInMon swait wait watchDog

algebraic/logical expression
-----------------------------
calc calcout
sCalcout swait transform wait

string expression
------------------
sCalcout
control structure (e.g. loop, switch, if-then)
----------------------------------------------
dfanout fanout sel seq calcout
lseq sseq scan sscan swait transform tsub

fixed algorithm
-------------
ai ao compress histogram
aRaw beamLife bpt cpid cvt epid findPeak interp pid spectrum table
waveAnl

subroutine
---------
sub
cvt mosub genSub bigGenSub ornlSub sSub tsub

semaphore/handshake
-------------------
permissive
busy runcontrol

menu (map integer to variable string)
-------------------------------------
bi bo mbbi mbbo (and variants)

lookup table / array interpolation
----------------------------------
ai ao
bpt cvt interp

Records emulating notions from digital electronics
==================================================

multiplexer/demultiplexer
-------------------------
dfanout fanout sel seq calc calcout
lseq sCalcout sseq status transform wfselector

flip-flop, logic gate, ALU, etc.
-------------------------------
calc calcout
sCalcout swait transform wait

programmable logic
------------------
pal

Records with special features
=============================

simulation mode
-------------
ai aai ao aao bi bo event histogram longin longout mbbi mbbiDirect mbbo mbboDirect stringin stringout waveform mca swait

select mask
----------
fanout seq
lseq sseq
Records to connect with a named port device or service
=====================================================================
asyn

Records specific to a hardware bus
=================================
gpib serial vme camac

Records specific to a hardware class
===================================

eg egevent er erevent
ddlypulse hiv mca motor pulseCounter pulseDelay pulseTrain
scaler servo stepper motor swf table timer trajectory wftime

Records specific to a particular piece or collection of hardware
===================================================================

ab* bates_bp m beamh beamhchan bpm bpmKek cm ddlypulsevme digitel dxp
ecdr814* gp307 iq memscan msbpm nmr nsldet p2* ps rf rt satRGA vacScan